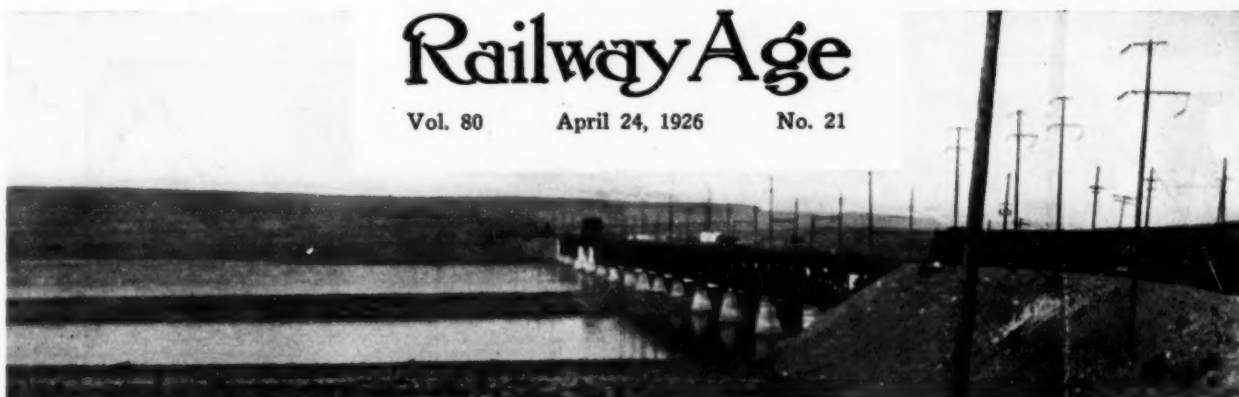


Railway Age

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Railway Age

Vol. 80, No. 21

April 24, 1926

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Evolution in Shop Machinery

A CONSTANT improvement is evident in railroad motive power, cars and operating methods, and it is the earnest desire of mechanical department officers to extend this improvement to maintenance work in repair shops and enginehouses. The best results can never be obtained, however, as long as many of the old machine tools and shop equipment now used are continued in service. Not all railroad officers realize the tremendous development, improvement and evolution which have taken place in shop machinery in the past few years. For example, a nationally known manufacturer of machine tools does not build a single machine in 1926 which resembles that type of machine made in 1920 except in a very general way. And the changes are not confined to "body lines" as is sometimes done with yearly models of automobiles to stimulate sales. Increased power, reduction of hand operations and studied layout of the whole design to permit maximum machine output with minimum operator effort are embodied in the new machines. While the *Railway Age* has made the statement before, it is worth repeating that the modern standard and special machines available for use in railroad shops and enginehouses are a splendid tribute to the toolmaker's art. At least one railroad has studied its machine tool situation with a view to replacing antiquated types, dividing the new machines needed into three groups: Those which will pay for themselves in six months; those in one year; and those in two years. It seems self-evident that no progressive railroad will longer delay in finding out what savings can be made by the installation of modern shop machinery and then proceed to get that machinery as fast as conditions will permit and naturally in the order in which it is most needed.

Ex-Senator Brookhart

IT is not exactly a matter of railroad news, but many railroad men are doubtless sufficiently interested in the fact to justify its being recorded here, that one Smith Wildman Brookhart is no longer a United States senator. The Senate decided on April 12 by a vote of 45 to 41 that he was not elected to that office at the last election and that for several months of the present session he has occupied a seat that properly belonged to Daniel F. Steck, Democrat. In this case the Democrats gain one vote, while the Republicans can hardly be said to have lost one, although Mr. Brookhart has been acting as a senator for some time on the theory that the Republican candidate was elected. We shall miss from the pages of the Congressional Record Mr. Brookhart's familiar speech about how the railroads increased their operating expenses in the year in which they were returned from federal control by about \$1,400,000,000, without reference to the part played by the government in bringing about the increase, nor to the fact that the railroads have since reduced their expenses by an approximately similar amount while handling

more traffic. All of which will tend to elevate the plane on which discussions of railroad subjects are conducted in the Senate, although there are several senators left capable of supplying to the Congressional Record the kind of fiction to which it has been accustomed. As a senator, Mr. Brookhart probably did the railroads no particular harm. While one or two of the railroad bills which he introduced caused apprehension in some quarters, particularly among those who fail to realize that most bills in Congress never get anywhere, we cannot recall that they ever got to first base; that is, that they were never seriously considered in committee. During recent months, when he did not know whether he was a senator or not, his activities have been largely devoted to another subject of great interest to himself, but in his campaign to defeat Senator Cummins at the next election he will probably add some more gems to the literature of railway economics.

Gas-Electric Welding

TWO new methods of fusion welding have been developed in different laboratories of the General Electric Company, the investigators working independently. Both methods promise to advance the art of welding and to extend its use. One method developed at Schenectady, New York, is known as a tonic hydrogen arc welding. With this method a stream of hydrogen is passed through an electric arc formed between two non-consuming tungsten electrodes. In passing through the arc the molecular hydrogen (H_2) is changed to atomic hydrogen (H) and a short distance beyond the arc the atomic hydrogen changes back to molecular hydrogen, the change being accompanied by extremely high temperatures, sufficient to melt molybdenum. The principal advantage of this kind of welding lies in the fact that the atomic hydrogen is a reducing agent and prevents oxidation at the weld. The second method developed at Lynn, Mass., consists of surrounding an ordinary consuming metal arc electrode in a gaseous atmosphere. Hydrogen and mixtures of hydrogen with other gases have been used for this purpose, all of which have succeeded in excluding oxygen from the weld. When steel is welded by either method the result is a ductile weld capable of withstanding bending without cracking. The atomic hydrogen arc method is suitable for thin sections and the Lynn method can be used on heavy sections. New fields of application will probably be opened by these processes particularly in the welding of non-ferrous metals. The processes have many commercial and manufacturing possibilities and probably will eventually be used for repair work. The torches used are somewhat intricate in appearance but are light weight tools which are not difficult to manipulate. When the art of welding was new it was hailed as a panacea. The result was that many mistakes were made and it was necessary to restrict its use sharply in the interest of safety. Such developments as gas-electric welding, how-

ever, show that the art is developing steadily and rules governing the use of welding should not be looked upon as something unalterable. Such rules will require gradual modification as the science and art of welding are developed.

Ralph Budd on Highway Transportation

THE address of Ralph Budd, president of the Great Northern, on The Relation of Highway Transportation to the Railways, which was delivered at the meeting of the American Society of Civil Engineers at Kansas City last week, is probably the most thorough and authoritative analysis of this subject that has ever been given. An abstract of the address is published in the Motor Transport Section of this issue, and is worthy of the close study of railway officers. Mr. Budd speaks with authority on motor transportation. The Great Northern is the largest steam railway operator of motor buses in the United States. Its subsidiary, the Northland Transportation Company, operates 138 motor buses over more than 2,000 miles of highway routes in Minnesota, a mileage equal to that of the Great Northern's railway lines in that state. Of particular significance are Mr. Budd's views on the cost of bus transportation and their relation to the cost of railway transportation. He estimates that the ratio of the cost of highway bus to steam train operation is about one to five. In other words, as he points out, for the cost of one train in each direction on a given line, once in the morning and once in the evening, a bus can be run every two hours in each direction, from 8 a. m. to 4 p. m. Of equal importance is Mr. Budd's statement that the cost of operating a motor bus, which varies now from 23.6 to 30.6 cents per bus mile, depending on the mileage operated, can be reduced at least 15 per cent.

Competitive or Substitute Service by Motor Vehicles?

FREQUENT stopping is a costly business for a train; it is much less important in the case of a highway vehicle. In the latter case the cost of the stop itself is negligible and acceleration to regular speed after a stop is much more rapid than with a train. There is no reason, therefore, from a logical standpoint pure and simple, why a railroad which operates buses and trucks should limit these vehicles to station-to-station stops. There are reasons of expediency, however, which may make it necessary in some cases for railroads operating highway service to ignore logic for the time being and seek powers only for service analogous to that provided by trains. Among such reasons may be mentioned the opposition of other highway carriers, which may not be able to oppose effectively the railroads' effort to offer a highway service from station to station only, but which might find a sympathetic ear if the railroads should attempt to give a complete house-to-house service in competition with them. Many railroads can unquestionably utilize the motor vehicle with profit even if it is not used to give a service beyond that offered by trains. But the motor vehicle is potentially more than a substitute. Highway carriers which give house-to-house or corner-to-corner service can continue to compete seriously with the railroads, even for relatively long hauls, because of their more intimate service. Although the average speed of such service may be slower than that given by the railroad's station-to-station service,

many patrons may be expected to prefer it because it provides complete transportation from origin to destination. A really aggressive motor traffic policy on the part of the railroads operating highway vehicles would probably entail railway service on the highways of the same local character as that given by independent bus and truck operators. However, too much aggressiveness is often not the wisest character to display in the early days of a new development. What the policy in the early stages should be, each railroad must decide in the light of its own local conditions.

Senator Cummins' New Consolidation Bill

SENATOR CUMMINS' new bill for the consolidation of railways, which has been reported favorably by the Senate Committee on Interstate Commerce, would radically change both the consolidation and the recapture provisions of the Transportation Act. In some respects it would be an improvement over the existing provisions. It would, however, require the Interstate Commerce Commission, after the passage of five years, to draw up a plan for compulsory consolidations of such railways as had not in the meantime been merged into large systems. Its compulsory provisions are unmitigatedly objectionable.

Among the improvements it would make are the following:

1. It would eliminate the requirement in the existing law that the securities of a consolidated system should not exceed the combined valuations of its constituent properties as found by the Interstate Commerce Commission. This requirement has tended to make the consolidation provisions of the Transportation Act unworkable, partly because the Commission has not completed final valuations of the various railways.
2. It would postpone for five years the time when the Commission must draw up plans for consolidations, and therefore leave them voluntary, subject to the commission's approval, for this period.
3. It would provide that the test of whether a railway has net operating income in excess of 6 per cent subject to recapture should be its average net operating income for three consecutive years and not year by year.
4. It would cause recaptured money to be distributed among railways earning less than 5 per cent. The recapture provisions of the Transportation Act contemplate that the recaptured money shall be made available for use by weak lines in the form of loans or leases of equipment, but are so framed that they can hardly be given this practical effect.

The purpose of the bill to use the recapture and distribution of earnings to stimulate consolidations is plain. For example, it provides that once the commission has authorized or required the consolidation of certain properties, excess earnings collected from any of these properties shall thereafter be distributed among other properties in the same proposed system. Likewise, once a merger satisfactory to the commission has been formed the resulting consolidated system will be exempted from all recapture of earnings. In the Transportation Act the recapture provisions are a part of the rate-making provisions.

They were originally intended to nullify the argument against making rates high enough to enable all the railways to earn a fair average return because this would enable the more prosperous roads to earn returns

regarded as excessive. Now Senator Cummins seeks to use the recapture of earnings solely to promote consolidations, his assumption being that after his program had been carried out there would be very little difference between the percentages of return earned by different systems.

The consolidation provisions of the Transportation Act merely provide, in effect, that the Interstate Commerce Commission shall make a general plan for consolidations and that thereafter no consolidations not included in this plan shall be allowed. Senator Cummins' new bill goes very much farther. It provides that once the commission has approved any proposed consolidation, whether initiated by interested carriers or by the commission itself or after the five years of voluntary action have expired, the commission may authorize any carrier which in its opinion owns or controls a major part of the main track mileage within the proposed system to acquire through condemnation proceedings the ownership and control of the remainder of the main track mileage or other railway properties within the proposed system. The condemnation proceedings would be conducted in the federal courts and the commission could act as appraiser of the properties for the courts. Condemnation of the securities of railways included in proposed systems is similarly provided for.

It cannot be said that this bill has no teeth in it. It would use recapture and distribution of earnings to stimulate consolidations, it would require the commission after five years to make plans for them, and it would empower somewhat more than one-half of the owners of the railways of the country to condemn and take the property of the owners of somewhat less than one-half of the railways. All this is to be done in the supposed "public interest." No such drastic and revolutionary measure for compulsorily transferring property wholesale from one set of private owners to another ever has been proposed in the United States. It would embark the entire railroad industry upon the uncertain ocean of interminable litigation. The views of lawyers as to whether the public interest involved is plain and important enough to make such legislation constitutional will be highly interesting.

It is argued in support of the proposed legislation that "if a process of wise consolidation was not soon entered upon and rapidly carried forward not less than 60,000 miles, and it may reach 80,000 miles, of our rail transportation system may be either abandoned or at the best would be rendering the most unsatisfactory and inefficient service." Statistics regarding net returns earned in 1922, 1923 and 1924 are cited in support of this view. The average return earned by all the railways of the country in these years was only about 4 per cent on their property investment. The main reason why the weak roads have suffered so much has been that the returns allowed to be earned by the roads as a whole have been so small. The weak roads would not have been so weak except for a policy of regulation that has denied to all roads their right to earn reasonable returns.

The Senate Committee also said in its report, which was written by Senator Cummins: "It has been estimated that with the service now being rendered there will be (under the proposed policy of consolidations) a saving of from \$300,000,000 to \$500,000,000 annually, all of which could be utilized in the reduction of freight and passenger rates." Who made this estimate? How was it made? No expert on railway operation made it or would accept it. The Interstate Commerce Commission did not make it. In a recent hearing before the Senate Committee on Interstate Commerce, Chairman Eastman, speaking for a majority of the Interstate Commerce Commission, said, "We think that the country ought not to be led into the belief

that great consolidations of railroad properties involve any probability that the general level of freight rates may thereby be substantially reduced. Economy and efficiency of operation are much more than a matter of size. There are small railroad companies which are as economically and efficiently operated as any of the great railroad systems. It still remains a question how far a single management can with advantage be extended over railway lines."

The correctness of these statements of Chairman Eastman can be demonstrated by an overwhelming array of facts.

There are 51 railways which last year had gross earnings of \$25,000,000 or more. The ten railways that had the lowest ratios of operating expenses to earnings varied in mileage from 460 to 9,200 miles and had total earnings from \$25,000,000 to \$200,000,000. The ten railways that had the highest ratios of operating expenses to earnings varied in mileage from 230 miles to 11,200 miles and had total earnings ranging from \$27,000,000 to \$672,000,000. The ten of these railways having the lowest ratios of conducting transportation expenses to total revenues varied in mileage from 231 to 9,200 miles and in total earnings from \$28,000,000 to \$200,000,000. The ten railways having the highest ratios of cost of conducting transportation to total earnings had mileages varying from 397 miles to 8,500 miles and total earnings ranging from \$22,000,000 to \$150,000,000. Now, of course, the ratios of total operating expenses and cost of conducting transportation to total earnings are only very rough, and often are quite misleading measures of operating efficiency and economy. But what they do very forcibly tend to show is that there is very little relationship between the size of railways and their operating and financial results; and every other measure of efficiency and economy that could be applied would tend to show the same thing. The theory that mere increase in the size of our railway systems by consolidation would result in huge savings is not supported by the available evidence.

Some light upon this matter is thrown by the evidence introduced in the hearings on the proposed Van Sweringen merger.

The Interstate Commerce Commission found this evidence showed that saving of approximately \$6,000,000 a year could be effected by the proposed consolidation. This finding was based upon testimony given by engineering and operating experts of great ability after thorough investigation and study. The Van Sweringen plan would have merged railways handling about one-seventeenth of the total railroad traffic of the country. Although, therefore, it would be possible to have in the country only 17 railway systems each of which would handle as much business as the proposed Van Sweringen system, and although a large part of the railways already have been combined into large systems, there could be effected by consolidations, according to the estimate given by Senator Cummins, total savings from fifty to almost one hundred times as great as those the Commission found could be effected by the Van Sweringen merger. The estimate given by Senator Cummins is preposterous; no facts whatever are given in support of it; and it is a great pity that the wide currency it has secured may mislead many people regarding this important subject.

It is to be hoped that some measure for changing the consolidation provisions of the Transportation Act will be passed. It is also to be hoped that Senator Cummins' bill will not be passed. His argument for it is based upon untenable premises and the compulsion it would apply would involve invasions of private property rights, and might in the long run bring about consolidations, that would be wholly contrary to the public interest.

Educating Public and Employees

IN a recent personal letter to one of the editors of the *Railway Age*, J. H. Hustis, retiring president of the Boston and Maine, made some observations on the need for educational work on behalf of the railways which were so interesting and constructive that we have secured his permission to quote them.

"I am calling attention" (in the Boston and Maine annual report for 1925), said Mr. Hustis, "to the fact that railroads, though privately owned, are no longer privately operated, and aside from their control through laws, federal and state, and regulations having the effect of law, there have grown up in recent years organized public groups, local, state and national, whose views have entered, and are largely entering, into shaping the limitations and privileges of rail transportation, and in shaping railroad policies.

"I believe that as never before railroads must employ men to explain and interpret their policies. If railroads are to survive under private management, there is much educational work to be done, not only among the general public, but among the officers and employees of the railroads as well.

"I think the railroads, especially the larger systems, would do well to train men for this particular work, for it must not be done in a haphazard way, but carefully thought out and as carefully directed. It would not only require men who know the facts, but who can state them convincingly, and would of course require different kinds of men with different training for the different activities. The higher executives of railroads, with but few exceptions, shrink from public speaking, and they should not be required to do it.

"What I am suggesting is not new, nor is it as simple as it seems, but I am more and more persuaded that part of the troubles of the railroads today is due to the lack of adequate knowledge, not only on the part of the public, but on the part of the directors, executives, officers and employees, of the fundamentals connected with the railroad problem. Of course, if the railroads were like the Telephone Company or the Pullman Company, acting under one direction or one policy, then the proposition would be very much simpler."

There has been within recent years a large increase in the educational work done by the railways. Nevertheless, Mr. Hustis, surveying the situation as he approached retirement from railroad service, expressed the opinion that "as never before the railroads must employ men to explain and interpret their policies," and that the survival of private ownership itself depends upon their doing so. He made clear how he thought it ought to be done. "The higher executives of railroads," he said, "with but few exceptions, shrink from public speaking, and they should not be required to do it. The railroads should employ able men and train them for this particular work, for it must not be done in a haphazard way, but carefully thought out and as carefully directed."

No better statement of one of the major problems confronting the railroads, or of the way it must be solved, if it is to be solved at all, has been made. The attitude of the employees and the public is more intelligent and friendly now than it has been for years. This is due to improvements in service that have been made and to educational work that has been done. But this more intelligent and friendly attitude does not show that a continuance and enlargement of educational work is not needed. It merely illustrates what can be accomplished by it.

The sentiment of employees and the public is subject to constant change. It will at all times be getting either better or worse. It is as much a function of railroad management to strive constantly to make it better as it is to run trains. Misunderstanding regarding railway matters always will constantly arise. The railroad industry is vast and complex. The railroad problem—which is the problem of establishing and maintaining fair relations between the rates paid by the public, the wages paid to employees and the returns earned for investors—is consequently vast and complex. The misunderstandings regarding it that constantly arise are partly due to misrepresentations that are

disseminated among the employees and the public. The only way to prevent them from leading to serious results is constantly to have railway matters explained, and problems of management and regulation discussed by men who thoroughly understand them and know how to talk and write about them clearly and convincingly.

In spite of past experience there is still a tendency on many railways seriously to underestimate the importance of work of this kind. Abraham Lincoln said something many years ago which is very apropos. "Public sentiment," he said, "is everything. With public sentiment nothing can fail; without it, nothing can succeed. Consequently he who molds public sentiment goes deeper than he who enacts statutes or pronounces decisions. He makes statutes and decisions possible or impossible to be executed." No more striking illustration of the truth of these statements ever has been afforded than by the experience of the railways during the last quarter of a century.

The chief executive of a railroad must be its principal industrial relations and public relations officer, because he must be the head of all its departments. On large systems, however, the direction of each important department, operating, traffic, purchasing, accounting, legal or financial, is delegated to a vice-president or other officer of corresponding rank having experience and training especially fitting him for its direction. As Mr. Hustis indicates in his letter, the work of educating railway employees and the public regarding railway conditions and problems and keeping them educated demands men of great ability and special knowledge and training. They should be the expert advisers and representatives of the chief executive regarding such matters. Such men should be given official rank corresponding to their ability and special fitness and to the importance of their work. In the existing organizations of most railways these facts are not given adequate recognition. On many railways they are hardly given any recognition at all. In consequence, on many or most railroads many times as much attention and expenditure are devoted to numerous things of quite minor importance as are devoted to the vastly importance work of molding public sentiment, which Lincoln said is "everything."

Rough Handling of Passenger Trains

DURING recent months the subject of rough handling of passenger trains has been much discussed by railway operating officers, air brake engineers and supervisors, and locomotive enginemen. Much of this discussion has been centered about the enginemen's handling of brake valve and throttle, and implied, if not actual, criticisms of their carefulness and skill have at times led to sharp rejoinders in their defense.

There is little merit in comment on this subject which makes it appear that any class of railway employees as a group is entirely responsible for rough handling, be the group the enginemen, the air brake or other equipment maintenance forces, or the trainmasters and road foremen. It is true that special "drives" to interest and instruct one or more of these groups have improved train handling on some railroads, but the fact that special attention at frequently recurring intervals is required to keep up a reasonably satisfactory standard of performance is evidence that conditions over which the men have little or no control are probably also in need of attention if a complete solution of the problem is to be effected. While men of unusual skill may give

little trouble, the men of average skill determine the level of performance.

That brake equipment is available such that train stops of enginemen of average skill may be made to approach in smoothness those of men of exceptional skill, is suggested by the interesting tests of the quick service feature of the passenger car universal valve run last summer on the Pennsylvania, and described elsewhere in this issue. But the handling of the air brake in stopping is only one cause of rough handling, and, indeed, it is probable that some of the most objectionable cases of rough handling occur when heavy trains are being started, and therefore all of the conditions that affect stopping and starting must be considered.

The conditions which have increased the prevalence of rough handling in starting modern passenger trains all arise from one source—the tremendous weight to which these trains have grown and the tremendous drawbar pull required to move these great weights. The ideal condition for smoothness in starting would be a train in which no movement were possible between any of the vehicles, so that the entire mass, including the locomotive, would start at one time. Such a train, however, would be beyond the starting capacity of a steam locomotive with tractive force and horsepower enough to move it on any reasonable schedule. A train in which the slack between the vehicles is completely uncushioned would offer the least resistance to starting because the high starting resistance of each vehicle would be overcome successively with a resultant maximum force requirement considerably below the sum of the starting resistances of all of the vehicles in the train. Such a train, however, would be subjected to shocks which, if not actually destructive of the equipment, would be found to be intolerable by passengers. Some degree of cushioning of the relative movement between the vehicles is obviously essential.

It is not an easy matter, however, to provide a cushioning effect between the cars soft enough to prevent discomfort to passengers when a powerful Pacific type locomotive brings the whole of its 40,000 to 45,000 lb. tractive force against the train after taking the slack, even though the difference in velocity between any of the vehicles in the train may not be more than a fraction of a mile an hour. If, as is sometimes the case, part of the movement between the locomotive and first car is without resistance of any kind, a satisfactorily smooth start after taking the slack is a practical impossibility.

It must be evident, then, that the problem of rough handling in starting passenger trains will continue to be encountered until the ratio of available starting force to standing and slow-speed train resistance is increased. This may be done either by providing locomotives with greater starting tractive force, or by reducing the starting resistance of the cars. The former will not be wholly effective because the demand for longer trains will probably result in increasing the weight of trains as fast as increased tractive force is made available, because in heavy through passenger service, where stops are relatively infrequent, the factor limiting the number of cars will be the horsepower capacity of the locomotive. In modern power, this is usually great enough to maintain the schedule with trains heavier than can be started with ease. No doubt the use of a booster would be helpful because its tractive force would be available in starting without increasing the size of the train which could be handled at speeds.

The reduction in starting train resistance, however, offers greater possibilities for permanent improvement in rough starting conditions because it will tend to decrease the difference between starting resistance and the resistance at high speeds. The adaptation of anti-friction bear-

ings of the ball and roller types so well developed in other fields, to car journals is already being accomplished and is now commanding the attention of some railroad officers. While there are many other reasons from a dollars and cents standpoint more potent than the improvement in train handling which make the possibilities of these types of bearings very attractive, their less tangible value in this respect may ultimately prove to be fully as important as the results which are financially more tangible.

In the meantime, continued efforts to develop the utmost skill on the part of the enginemen in dealing with their difficult job are, of course, essential; but such efforts must be conducted in a spirit of toleration which does not unduly censure the average man for not equaling the performance of the most skilled man. The reduction or elimination of rough handling requires improvement in the mechanical features of trains as well as in the care and skill of the men who handle them.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,
Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Cumulative Index to the Proceedings of the National Safety Council for the Years 1919-1925. On pages 66-67 are indexed material on railroad accidents and accident prevention. Other headings of interest are "Goggles," p. 36; "Grade Crossings," p. 36; "Handling Materials," p. 37-38; "Health Supervision of Employees," p. 39, and "Traffic" (motor), p. 81-82. 87 p. Pub. by Library and Information Bureau, National Safety Council, Chicago, Ill. Apply.

My Ideal Railway Surgeon, by James A. Jones. Mr. Jones' paper contains material on the first railway surgeons appointed and the first railway hospital departments. Reprint from Texas State Journal of Medicine, Jan., 1926. 18 p. Available from author, Fort Worth, Texas.

Preliminary Statement of Capitalization and Income, Class I Steam Railways in the United States, Year Ended December 31, 1925, compiled by Bureau of Statistics, U. S. Interstate Commerce Commission. " * * * primarily for the purpose of furnishing certain income and balance sheet items frequently called for and not appearing in the monthly reports of revenues and expenses." p. 3. 33 p. Pub. by Govt. Print. Off., Washington, D. C.

The Railroad Freight Service, by Grover G. Huebner and Emory R. Johnson. Describes railroad freight services, freight traffic rules and practices, and organizations of various departments by which these services are performed. Recognizes recent developments such as Regional Advisory Boards. 589 p. Pub. by D. Appleton & Co., New York. \$5.

Periodical Articles

The Beginnings of the New York Central Railroad, by Frank W. Stevens. First of a series of articles on N. Y. C. history. Illustrated from old photographs and documents. New York Central Lines Magazine, April, 1926, p. 17-25.

Can All Our Railroads Be "Fordized?" by Edward Hungerford. The Ford principles of railroad management and plans for reconstruction and electrification of the Detroit, Toledo & Ironton. Forbes, April 15, 1926, p. 13-16, 42.

The Clearing Yard of the Belt Railway of Chicago, by Walker H. Evans. Illustrated. Baldwin Locomotives, April, 1926, p. 50-53.

The Problem of Railway Terminal Operation, by Prof. Wm. Z. Ripley. What the problem is, and what so far has been written about it. Harvard Business Review, April, 1926, p. 266-274.

Protection of Non-Voting Stock, by Adolf A. Berle, Jr. A review of recent discussions and decisions involving stock issues. Harvard Business Review, April, 1926, p. 257-265.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

Gross Ton-Miles per Train Hour

CAMBRIDGE, Mass.

TO THE EDITOR:

In your issue of March 13, 1926, S. R. Truesdell, of the Chicawo & North Western, writes to criticize in certain respects Professor Cunningham's advocacy (*Railway Age* of February 6, page 373) of the unit of gross ton-miles per freight train-hour as a measure of efficiency in freight train operation. Mr. Truesdell's criticism is of interest, but it is considered that in certain points his assumptions and deductions are not altogether sound.

In the first place Mr. Truesdell asks why a locomotive which handled 2000 tons over 100 miles in 7 hours after the campaign, when 10 hours had been consumed before, was not loaded up to 2500 tons in the first place; "since the locomotive should have been capable of it if it was capable of the increased speed." The answer is that the locomotive was run at no higher speed on the ruling grade than before, and it is the ruling grade that sets the tonnage. The reduction in time was obtained by a reduction in delays and by an improvement in the running speed on the easier portions of the road.

Professor Cunningham specifically stated that the index was used to stimulate a reduction of time by these means. It seems, therefore, that Mr. Truesdell's further request that Professor Cunningham "should strongly qualify the means by which increased speed is brought about" has been met. It seems also that to make the assumption that "the operation of the line is at its point of greatest efficiency so far as train delays and lost time on the road, etc., are concerned" is to miss the main feature of the Central Vermont campaign. Mr. Truesdell says, "Train delays and lost time on the road have always been closely watched." No doubt they have, but the tendency has been to compare the individual delays with a normal which has been developed haphazardly in the past. This normal is based on no more scientific investigation than the tonnage rating which "being more technical," as Mr. Truesdell says, "has in many cases been slighted." Time, in fact, is as relative as tonnage. Mere close watching avails no more with the one than with the other if the normal or standard of comparison is wrong. It was to achieve an improvement in the normal that the campaign was started.

Secondly, Mr. Truesdell, having made the assumption that the delays are at the minimum (which is quite valid, but which, as we have seen, rather misses the main point) proceeds to lay it down that the maximum number of gross ton-miles per freight train-hour is obtained at a speed so high that the operating cost per ton-mile is not at its minimum. This may be correct, but Mr. Truesdell's demonstration of it is open to considerable objection. He does not distinguish accurately between various kinds of speed. His argument appears to be that in order to secure the maximum gross ton-miles per train-hour the overall speed must remain so high that the speed on the ruling grade has to be increased and hence the ton-

nage per train has to be reduced. At some critical overall speed, moreover, costs per train-mile cease to decline with increase of speed and remain stationary (or even increase somewhat); but if the tonnage per train is reduced, more train-miles will be necessary for a given number of ton-miles; and as a result the operating costs per ton-mile will be increased considerably. The fallacy in this reasoning lies in the assumption that in order to secure the maximum number of gross ton-miles per train hour it is necessary to reduce the tonnage per train. This assumption confuses speed on the ruling grade with overall speed. It would be quite possible to keep the speed on the ruling grade down to the minimum and still to increase the overall speed by smarter running on other portions of the road and hence to secure the increased gross ton-miles per train hour with no reduction in train tonnage. Mr. Truesdell's assumption would be correct only if the ruling grade made up the greater proportion of the run, which is by no means the usual case. The 28 per cent increase in train miles which he assumes as necessary if the maximum gross ton-miles per train-hour are to be secured is incorrect. This also explains why the locomotive which could reduce its time on a 2000-ton train could not necessarily have handled 2500 tons in the first place.

It is true that there is a critical point. When the overall speed has increased to the value already referred to, at which cost per train-mile ceases to decrease and remains stationary, then the increase of gross ton-miles per freight train-hour obtained by increasing the overall speed (even without increasing the speed on the ruling gradient) is accompanied by an increase in ton-mile costs, so that as an index of efficiency gross ton-miles per freight train-hour loses its value. This point, however, was emphasized by Professor Cunningham near the end of his discussion. The determination of the critical overall speed is difficult but since train wages per train-mile decrease until an overall speed of over 12.5 miles per hour is reached, and repair and fuel costs per train-mile probably do not rise appreciably until the overall speed increases beyond 15 miles per hour, it would seem that the "scheduled" (or overall) speed of 10 to 11 miles per hour mentioned by Mr. Truesdell as the speed of lowest ton mile cost is quite unnecessarily low.

Thirdly, Mr. Truesdell questions whether the interest of the employees can be retained in view of "the large decrease in wages." It is to be noted that the individual's wages are not decreased except as a result of the reduction in the amount of overtime worked; and it seems to be the opinion of competent observers that the average train crew employee has no objection to a reduction of overtime, as he values his leisure more highly than the compensation secured. The decrease is in the total wages paid, and this may be very well offset, if the campaign is successful, by increased business accruing to the road by reason of better transportation service, or merely, in time, by the natural growth in business. The result will be rather more output for the same wages bill than the same output on a smaller payroll. Hence it is not so certain that employee co-operation cannot be retained if the matter is judiciously handled.

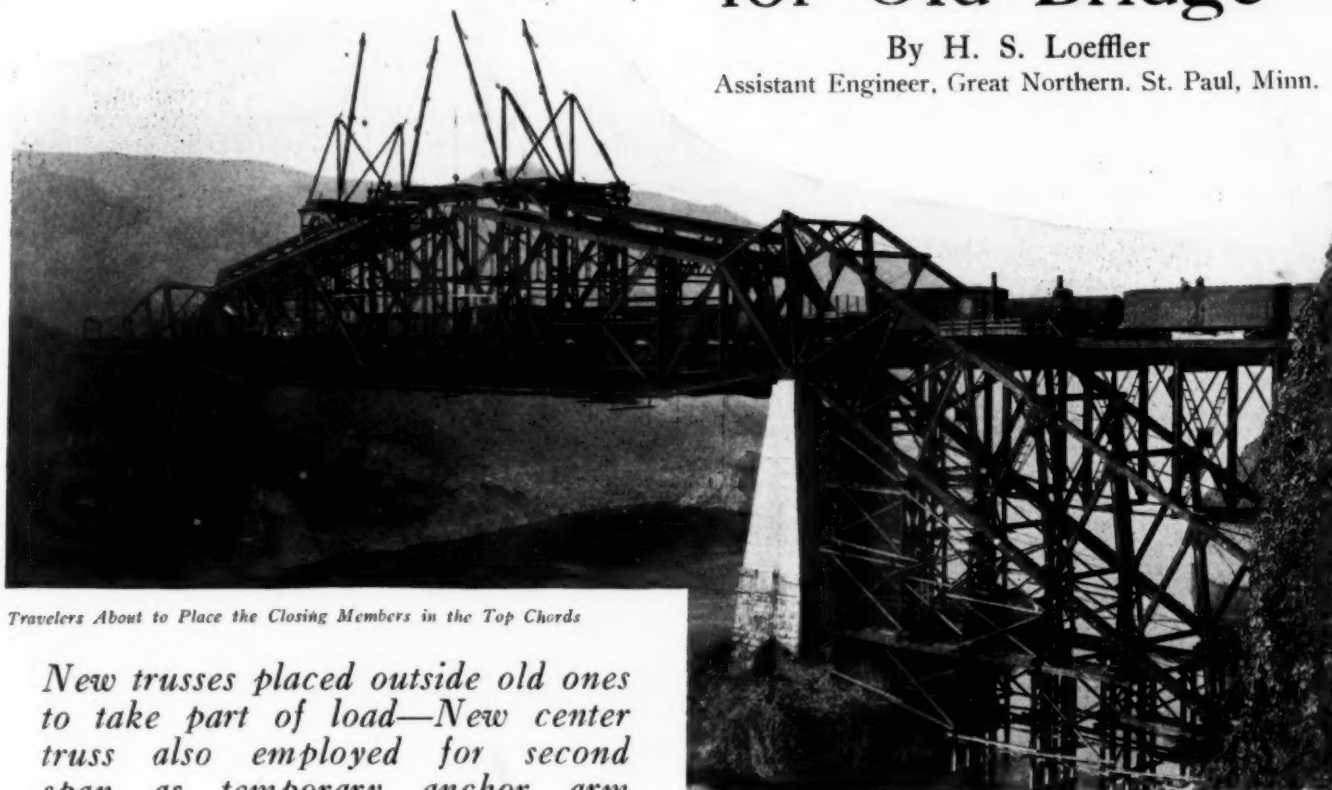
If it is doubted that employee interest can be secured and maintained, an incentive can be offered in the form of a bonus for increasing the gross ton-miles per freight train-hour. This would permit the employees to share with the company the savings they make. This plan would have the advantage of being free from outside influences and the bonus should fluctuate quite closely with the efforts of the employees.

DORRIS A. HANES,
Captain, Q. M. Corps, U. S. Army.

Develop Ingenious Reinforcement for Old Bridge

By H. S. Loeffler

Assistant Engineer, Great Northern. St. Paul, Minn.



Travelers About to Place the Closing Members in the Top Chords

New trusses placed outside old ones to take part of load—New center truss also employed for second span as temporary anchor arm

DURING the last few years the Great Northern has strengthened a number of its largest steel bridges and has just completed the strengthening of its bridge over the Columbia river by an unusual and effective method. The old structure, being in excellent condition, was retained practically intact, and as reinforced, has double the strength of the original bridge.

The main line of the Great Northern crosses the Columbia river 10 miles east of Wenatchee, Wash., where the river flows in a solid rock channel approximately 600 ft. in width while the depth of water in the deepest part is about 150 ft. Here the Columbia was spanned in the winter of 1892-93 by a steel bridge consisting of a 250-ft. pin-connected deck truss span and a 416½-ft. pin-connected through truss span. A few years later a steel trestle approach 210 ft. in length was added at the west end.

This, the original bridge, is supported on concrete and stone masonry piers resting on solid rock foundations. A masonry pier on a rock island, about 200 ft. from the east shore, was constructed to carry a steel A-frame which supports the adjacent ends of the two truss spans. The west end of the 416½-ft. span is supported on a steel rocker bent. The original structure was designed to carry two 122-ton locomotives, followed by a uniform train load of 4,000 lb. per lin. ft. On the basis of the A. R. E. A. specifications, the allowable loading on the old structure is Cooper's E-35.

Build New Span Around Old One

The 416½-ft. span has been strengthened by the addition of two new steel trusses, forming a complete new span. The new trusses are identical in design with the trusses of the old span, except for some changes in the

end panels and some improvements in details. They are located in planes five feet outside of the old trusses, with their cords eight feet lower than the corresponding chords of the old span, thus allowing sufficient clearance to permit new floor-beams to pass under the bottom chords of the old trusses. The new span is provided with portal bracing, and top and bottom lateral systems, as well as with transverse bracing between the vertical posts at each panel point. To avoid interference between the two spans during erection, the members of the new transverse bracing were made wide enough to straddle the vertical posts of the old span with a clearance of two inches on each side.

The floor-beams of the new span were designed for Cooper's E-35 loading, and braced laterally by means of a single row of horizontal steel struts on the center line of the bridge, extending between the floor-beams and connected to the lower laterals at their intersections.

The old steel A-frame, previously mentioned, which supports the adjacent ends of the old 416½-ft. and 250-ft. spans has been encased in concrete to form a pier having a sufficient top width to accommodate the bearings for the east ends of the new 416½-ft. trusses. The west ends of these trusses are supported on a steel rocker bent, the columns of which are parallel with and outside of the columns of the old rocker bent. Three inches of clearance was provided between the old rocker bent and the transverse bracing of the new rocker bent to prevent interference during erection.

Used Cantilever Method of Erection

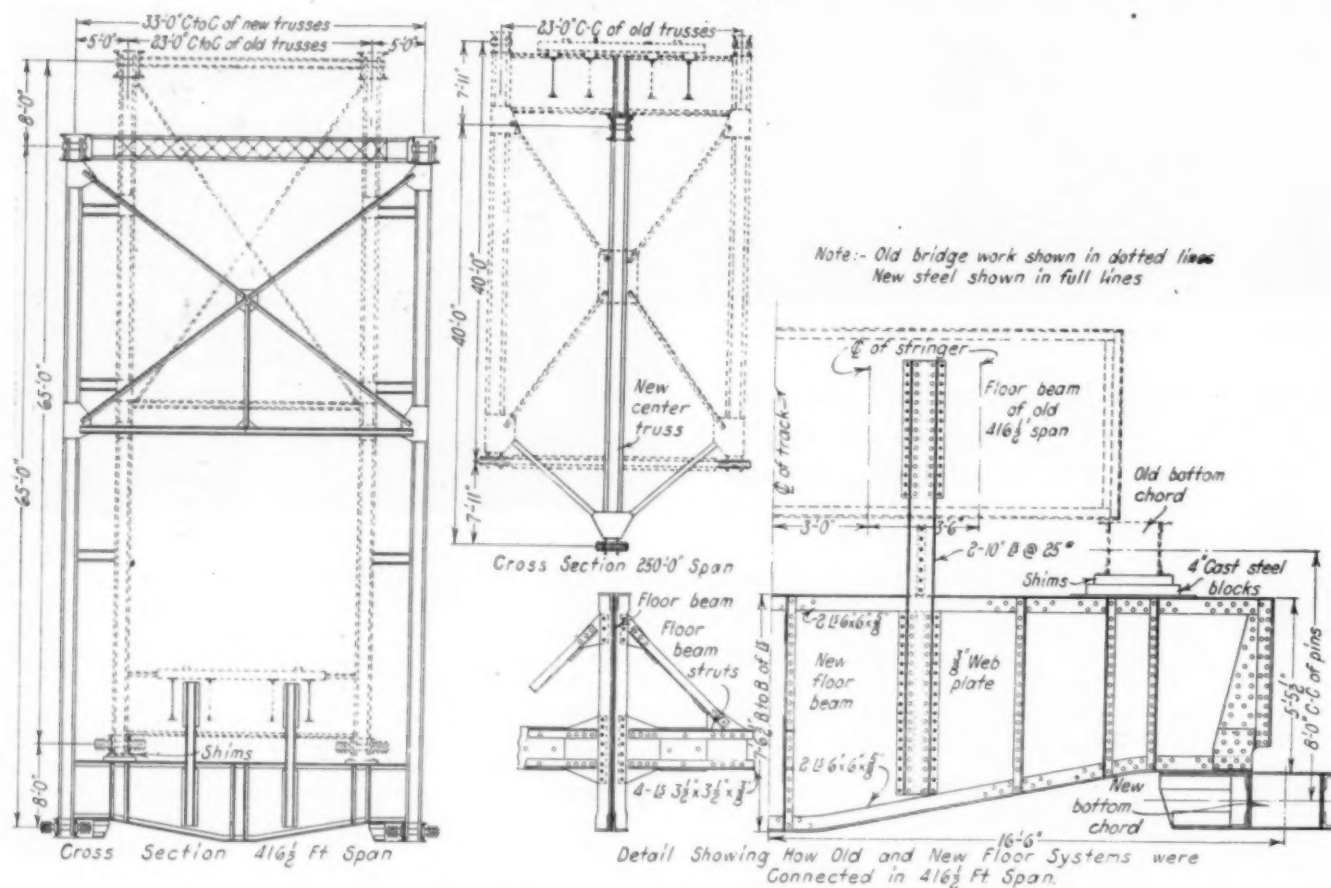
The erection of the new 416½-ft. span was accomplished by the cantilever method, this being the only practical method of erection because the depth of water in the main

channel precluded the use of falsework, and because the old span was not of sufficient strength to support the new span during erection in addition to the weight of passing trains.

In order to reduce to a minimum the amount of falsework steel required for erection purposes only, the major portions of the two anchor spans consist of steel trusses which were recovered and reused after they had served their purpose as anchor spans. Another span "A" at the east end consists of part of a 252-ft. riveted skew span which will be recovered and re-erected near Skykomish, Wash. Anchor span "B" at the west end consists of the two halves of a single 240-ft. pin-connected truss erected as two trusses 33 ft. center to center to form a 120-ft. anchor span. This span was later dismantled, taken

framed with only the two outside posts in place and lowered into position and plumbed before the two inside posts were set. After all four posts were in place the tops of the posts were cut off to the proper level and capped. To obtain a vertical bearing for the inclined chords of the anchor spans on the tops of the falsework bents, structural steel bearing brackets were provided.

As the dead load of the anchor spans was not sufficient to counterbalance the cantilever arms, counter-weight boxes were provided at the outer ends of the anchor spans in the form of 40-ft. deck plate girder spans which had been provided with diaphragms for connecting them to the anchor span trusses. (These girder spans will be recovered and re-used.) A timber floor was placed in these counter-weight boxes and the space between the



Typical Details of the Reinforcing for the Main Span

across the river to the east side, and re-erected as a center truss to strengthen the 250-ft. deck span. Both anchor spans were provided with lateral systems consisting of steel lateral bracing and timber cross struts. Steel cables were placed at several panel points to brace the anchor spans transversely.

Timber falsework was placed for the erection of the anchor spans. The falsework for the west anchor span was constructed on the west bank above the water level. The river bottom in the channel under the east anchor span is of solid rock, the surface of which is quite irregular. At the time the falsework was placed in this channel there was 17 ft. of swiftly running water, so that it was necessary to anchor each bent with a cable as it was lowered into the stream. The lower bents consist of four 12-in. by 12-in. posts 36 ft. long set directly on the rock without bottom sills. To insure proper bearing of all four posts of each bent on the irregular rock surface these bents were framed with only the two outside posts in place and

girders filled with gravel ballast. To supplement the load thus obtained steel rails were stacked on top of the counter-weight girders to give a weight 112,000 lb. in excess of the calculated load required in each of the counter-weights.

How the New Main Span Trusses Were Erected

The anchor spans and the first two panels at each end of the 416½-ft. span were erected with locomotive cranes; one 30-ton crane and one 60-ton crane being used. The balance of the 416½-ft. span was erected by means of two 12-ton capacity steel travelers, each equipped with two 65-ft. booms. These travelers were mounted on a timber frame supported on, and securely anchored to, the top chords of the new span. The four hoisting engines used in connection with the travelers were placed on either side of the track on the approach spans. The new structural steel was loaded on flat cars in the storage yard and moved to the bridge with a light locomotive. The travelers

handled the steel from the flat cars up through the top of the old span and landed it in place in the new trusses.

Four hydraulic jacks of 300 tons capacity were used at the outer end of each anchor span for vertical adjustment of the two cantilever arms, the jacks being located at the ends of the counter-weight girders. In addition to this a screw adjustment was provided at the west end of the west anchor span for the purpose of moving the west

After the new span was swung to carry its own dead load, and all truss splices fully riveted, steel shims were placed at each panel point between the bottoms of the old chords and the tops of the new floor-beams. These shims were adjusted to a snug fit without excessive driving. Observations were made with a Berry strain gage on the lower chords of both the old and the new spans before and after placing the shims in order to be certain that the



Construction Progress Views: (1) Center Columns Were Placed in the Tower Bents, (2) Hoisting Engines Were Placed on Either Side of the Track, (3) Unloading One of the New Bent Columns, (4) The Anchorage at the East End, (5) Strain Gages on the Eye-Bar Links, (6) The Pier on the Island, (7) The Counterweight Rails on the West Anchorage

anchor span and the west cantilever arm endwise for final closure.

Strain gages of special design were placed on the eye-bar links connecting the anchor spans to the cantilever arms. Observations were made on these gages during the jacking of the counter-weights and during the passage of trains to determine the stresses developed in these members due to friction between the cantilever arms and the old 416½-ft. span.

shims were not driven too tight which, of course, would have resulted in transferring too much of the dead load to the new span.

Placing the Struts

The steel struts connecting the new floor-beams to the old floor-beams were then placed and the field holes drilled through the webs of the old floor-beams to match the shop holes in the struts. The steel struts between the vertical

posts of the old and the new trusses were also placed at this time, and all connections made between the new transverse bracing and the vertical posts of the old span.

It was also necessary to provide greater capacity in the stringer construction of the main span which consisted of two main stringers with two safety stringers on the outside. The allowable load on the two main stringers was calculated at Cooper's E-35. To strengthen this part of the structure the safety stringers were replaced by new stringers identical in design with the old main stringers, with provision for distributing the loads to all four stringers in the form of steel plate diaphragms connecting the stringers at the mid-point and quarter points of each panel.

Strengthen 250-ft. Span With a New Center Truss

The 250-ft. span was strengthened, as previously mentioned, by the addition of a center truss, which was used first to serve as the west anchor span for the cantilever erection of the 416½-ft. span. It is of the same dimensions as the trusses of the old 250-ft. span except the end

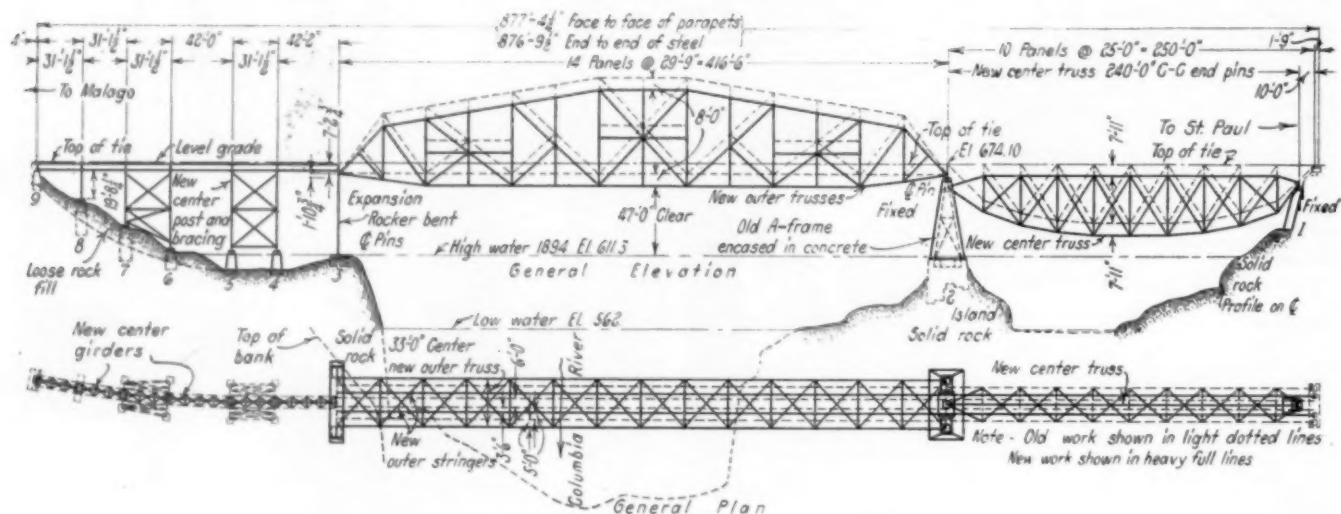
carried on concrete pedestals. The trestle reinforcement was designed for Cooper's E-35 loading. The new center girders are the same depth as the old girders. New cross-frames and new lateral bracing was provided throughout.

The A. R. E. A. specifications were used throughout for the design of the structural steel. The amount of material used in the reconstruction work is as follows:

Concrete in the substructure.....	1935 cu. yd.
Steel reinforcing bars in the substructure.....	8 tons
Structural steel (total)	1810 tons
The structural steel used was distributed as follows:	
West approach, including rocker-bent No. 3.....	190 tons
New 416½-ft. span and repairs to old 416½-ft. span..	940 tons
New 250-ft. center truss and repairs to old 250-ft. span	240 tons
Falsework*	440 tons

* Of the 440 tons of structural steel used as falsework 288 tons is to be recovered as new (to be re-used) and 152 tons is to be recovered as scrap.

Officers of the Great Northern who were actively connected with the work were: A. H. Hogeland, consulting engineer; J. R. W. Davis, chief engineer, and John A. Bohland, bridge engineer. The writer was engineer in charge, and was responsible for the method of reinforce-



General Dimensions of the Bridge as Reinforced

panels which had to be altered to fit the foundations. The allowable loading on the old 250-ft. span is Cooper's E-35 loading. The new center truss was also designed to carry Cooper's E-35 loading, in addition to its own dead load, so that the span as reinforced is capable of carrying Cooper's E-70 loading.

The new center truss was set 7 ft. 11 in. lower than the old trusses to allow the top chord of the new truss to clear the old floor-beams. New transverse bracing was provided for this span and also, an additional set of top lateral bracing which was placed in the plane of the bottom of the old floor-beams.

During erection the new center truss was supported on timber falsework. After the new truss was swung, steel shims were placed at each panel point between the bottom of the old floor-beams and the top of the new top chord. Connections were then made to the new transverse bracing and the cross struts. The floor system of the 250-ft. span was strengthened by reinforcement similar to that provided in the floor system of the 416½-ft. span as described above.

Reinforcing Steel Approach

The steel approach at the west end of the structure has been reinforced by the addition of girders and columns along the center-line of the bridge, the new columns being

ment. Ralph Modjeski, consulting engineer, Chicago, was consulted on several occasions in regard to certain features of the design and construction. The American Bridge Company fabricated the structural steel and carried out the erection work under contract with E. J. McGiverna as superintendent of construction and A. C. Beckman as field engineer.

The erection of the super-structure was started May 20, 1925, closure of the 416½-ft. span was made on October 27, and the work was completed about the end of the year.

Correction

IN an article based on a compilation by the Bureau of Labor Statistics of the Interstate Commerce Commission's statistics on casualties to railroad trainmen, published in the *Railway Age* of April 3, 1926, pages 973 and 974, a typographical error in the table on page 974 made it state fatality rates "per 1,000 hours' exposure," whereas the figures given are on a basis of 1,000,000 hours' exposure. The latter figure was correctly stated in the text of the article but the tabulation as printed makes the showing just a thousand times worse than was intended.

Transportation Division, A. R. A. Meets

*Memphis session attended by 150 members, discusses buses,
investigation of car hire settlements and
car service problems*

THE adoption of rules governing the procedure to be followed by the members of the Transportation Division of the American Railway Association in the investigation of car hire settlement by the Interstate Commerce Commission Docket 17,801, was one of the outstanding subjects considered at the annual meeting of the division at Memphis, Tenn., on April 15. The meeting was attended by 150 members. In the absence of Chairman J. J. Bernet, president of the New York, Chicago & St. Louis, vice-chairman W. A. Worthington, vice-president of the Southern Pacific, presided. An address of welcome was made by J. R. Paine, mayor of Memphis, and the work of the Car Service Division, in clearing up the situation in Florida through the co-operation of regional advisory boards, was described by M. J. Gormley, chairman of the Car Service Division. Through a letter ballot, J. T. Gillick, vice-president of the Chicago, Milwaukee & St. Paul, and J. J. Pelley, vice-president of the Illinois Central, were elected members of the General Committee, and C. H. Ewing, vice-president of the Reading Company, and C. M. Sheaffer, chief of transportation of the Pennsylvania, were re-elected.

W. A. Worthington Spoke on

Highway Bus Competition

In his opening address Mr. Worthington outlined the activities of the association during the past year and then spoke particularly upon the effect of highway bus competition on the passenger revenues of the American railroads. "Highway bus lines are eating into the gross passenger revenues of the American railroads at a tremendous and increasing rate each year," he said. "On the Pacific coast we are hit unusually hard. Recently a consolidation of bus operating companies perfected through service from San Diego, Cal., to Portland, Ore. Heretofore that was considered a long haul for the railroads.

"The railroads must fight this transportation by offering a better and more attractive service to the public. There must be faster trains, more comfort, and more accommodations. Wherever the Southern Pacific system extends, we face this competition with buses. I am inclined to believe the bus lines will never cut into our long haul traffic, but they are here to stay in the short haul, in both passenger and freight.

"Figures show that lines entering Memphis are having similar competition. It will continue, despite unofficial reports that the high cost of gasoline is retarding the use of buses. I cannot see where that is true.

"Some railroads are endeavoring to meet the competition by installing bus lines or motor cars. This is merely an experiment. It may prove profitable and may not. Whenever the railroads meet bus competition by offering more attractive trips to the public and maintain better train service by making trains more comfortable we probably will get a large proportion of the business now moving by way of the highways."

Report of General Committee

The outstanding subject in the report of the General Committee was the consideration of the general investigation into and concerning rules for car hire settlement between common carriers, I. C. C. Docket No. 17,801. The investigation covers the rules for car hire settlement between common carriers by railroad in the United States, including the use and detention of freight cars when on the lines of carriers other than their owners. A committee of counsel, composed of six men, was appointed to take charge of the defense of the Code of Per Diem Rules in this case and reported that F. H. Towner of the firm of Winston, Strawn & Shaw, Chicago, had been employed to take active charge of the preparation and presentation of evidence and to represent the association in the handling of the case. While Mr. Towner, acting for the Committee of Counsel, will have general charge of the defense of the case in support of the Code of Per Diem Rules as adopted by the association, it is expected that the individual roads will supplement the general presentation by the American Railway Association in defense of its rules to the extent necessary to deal with local or individual situations on their lines. A committee of eight was appointed by the General Committee to co-operate with the Committee of Counsel in the preparation of data in the defense of the Per Diem Rules.

The committee found the regulations governing embargoes which were adopted at the annual session of the division on April 25, 1923, needed revision, and upon recommendation of the General Committee, the president of the association appointed a joint committee consisting of legal, traffic and transportation representatives to agree upon some general plan of embargo policy for the future. The objective was to overcome the difficulties that have been experienced in the past and to eliminate in so far as possible the elements of discrimination in the handling of embargoes. This joint committee recommended a revision of the embargo regulations which received the approval of the General Committee and was submitted to the members of the association for a vote by letter ballot. Following their approval the regulations were made effective January 1, 1926.

The General Committee approved the recommendation of the Committee on Car Service, covering an increase in the reciprocal rate for short-routing empty cars from five cents to six cents per mile.

Report of Committee on Car Service

The Committee on Car Service reported that it had considered and disposed of a number of questions and controversies arising under the code of car service rules but the excellent conditions with respect to car handling which have prevailed throughout the year made it unnecessary to recommend any drastic changes in the rules which govern the handling of cars. Controversies have arisen in the enforcement of Car Service Rule 2 at points where interchange is effected through intermediate

switching lines and the information is not published in the Railway Equipment Register. To overcome these controversies, the committee urged all members of the association which have not done so, to publish the information in the register, as recommended by the association. The committee obtained information as to the cost of handling empty equipment under Car Service Rule 4, and, based upon the data obtained, it was recommended that the reciprocal rate for short routing empty cars be increased from five cents to six cents per mile. Under the proposed change in Car Service Rule 4, empty cars may be short-routed at a reciprocal rate of six cents per mile, plus bridge and terminal arbitraries, with a minimum of 100 miles for each road handling the car, the road requesting the service to pay the charges.

The committee considered jointly with representatives of the Mechanical division the difficulties that have been encountered in the application of Car Service Rule 14, paragraph (e), and Interchange Rule 2, Section (h), which provide that the road on which the shipment originated shall pay the cost of the readjusting of a shifted load caused by the omission of proper inside door protection and for the application of such protection. While correct in principle, these rules have been difficult of application, due very largely to the prevailing differences of opinion as to commodities which should be provided with inside door protection and the absence of detailed rules or specifications governing the loading of commodities not requiring inside door protection. The Loading Rules committee of the Mechanical division, assisted by representatives of the Transportation and Traffic divisions, will undertake to prepare a report showing a list of commodities which require inside door protection and to formulate rules and specifications for loading, with illustrations, of commodities not requiring inside door protection. Pending the compilation of such a report by the Mechanical division, the committee recommended that Car Service Rule 14 (e) and Interchange Rule 2 (h) be suspended and the rules they superseded restored in the form proposed by the committee.

After considering the responsibility for accepting empty private refrigerator cars in interchange, it was the opinion of the committee that no changes in the present rules are necessary or advisable. The opinion was based on the fact that all railroad-owned refrigerator cars, whether handled on a per diem or mileage basis, are subject to car service rules. In addition, the American Refrigerator Transit Company, the Pacific Fruit Express, the Merchants Despatch, the Fruit Growers Express, etc., are incorporated as private companies, and the handling of their cars comes under the regulations relative to private equipment, irrespective of the fact that the capital stock of these companies may all be owned by railways.

To insure greater uniformity in the handling of carload shipments in switching service which are tendered to consignees and refused, the committee recommended that loaded cars received from connections in switching movement, if refused by the consignee, be held by the switching line until disposition is given by the delivering line, the switching line to notify the delivering line agent immediately by wire or telephone, of the refusal of the car. The delivering line shall furnish the disposition without unnecessary delay. The car is to be held by the switching line under demurrage until disposition is received.

In considering the reports of cars refused in interchange or set back, the committee recommended that all roads issue instructions at once to their officers having jurisdiction over the handling of cars at interchange points, with a view to making the terms of the resolution fully effective, so that the cause for and the delays to both loads and empties incident to cars being "set back" may

be eliminated to the utmost practicable extent. At practically all of the larger points of interchange throughout the country there is a considerable number of cars set back which are not generally reported promptly to the proper transportation officer of the delivering road as contemplated in the resolution. In most cases the reports of cars set back are incident to per diem reclaim and accordingly the errors of commission or omission are not known to the supervising officer of the transportation department.

Report of Committee on Freight Handling Service

The Committee on Freight Handling Service reported that the activities of the committee during the past year had been confined very largely to bringing about improvements in methods of loading carload freight. The association adopted as recommended practice the methods recommended by the committee for loading bulk grain, coal, flour and other grain products in sacks, liquids in barrels, newsprint paper, and livestock.

The committee considered in joint conference with representatives of the Traffic, Freight Claim and Mechanical divisions the question of damage to sewer pipe, drain tile, hollow building tile, etc. Based upon the committee's suggestion, the managers of the weighing and inspection bureaus issued Circular No. 3, containing specifications for loading, stowing and bracing sewer pipe, drain tile and flue lining. A special committee consisting of one representative each from the Mechanical, Freight Claim, Traffic and Transportation divisions, is now giving consideration to a plan for conducting tests in loading clay products, for the purpose of determining what changes should be made in these rules in order to bring about improvement. In the meantime, the committee recommended that all members of the association undertake to secure observance of the rules and specifications set forth in Joint Circular No. 3.

Upon suggestions received through the Southeastern and Southwestern regional advisory boards, the committee recommended a uniform method for loading uncompressed bales of cotton linters, which it believes represents the best practice based upon experience, and if adopted will not only result in better loading but also heavier loading of this commodity. It also recommended that cotton compresses be required to load a maximum number of bales of compressed cotton and not less than a minimum of 75 bales per car.

Due to the many complaints from consignees against illegible and incomplete freight bills, the committee recommended (1) That shippers be required to furnish legible and complete bills of lading and shipping orders; (2) that the agent at point of origin be required to show on the waybill all of the information contained in the shipping order or bill of lading; (3) that the information carried on the original waybill also be shown on the connecting line transfers; (4) that in addition to the information required by the Interstate Commerce Commission, when an additional charge is assessed because classification requirements have not been complied with, the freight bill shows for the information of the consignee, the specific section or rule that has been violated.

Consideration was given to the subject of through interline billing of both carload and less-than-carload freight, and in that connection the committee recommended that in the interest of economy and efficiency through interline billing be extended and made effective wherever such action is practicable. It was believed that this can be done through the various traffic organizations by the promulgation of joint through rates and the protection of simple, equitable percentage divisions for apportioning the revenue among the interested carriers.

The formulation of better methods for blocking and bracing shipments of top-heavy machinery was considered in conference with representatives of the Loading Rules committee of the Mechanical division and as a result it was agreed to revise Loading Rule 309. It was also agreed that the Loading Rules committee of the Mechanical division will have tests made in accordance with the revised rule in order to develop whether any further changes or modifications should be made before the revised rule is finally adopted and made a part of the loading rules.

Report of Committee on Demurrage,

Storage, Reconsignment and Diversion

The Committee on Demurrage, Storage, Reconsignment and Diversion reported that difficulty had been experienced in the application of Demurrage Rule 1, Section B, Paragraph 4, where some private car owners have changed the evidence of ownership or lease on private cars after they have been placed for loading or unloading. In some instances temporary leases merely for the purpose of escaping the payment of demurrage charges have been resorted to. To correct this situation, after conference with the Demurrage and Storage committee of the National Industrial Traffic League, the committee recommended that the present rule be changed. Under the proposed form, a private car is a car having other than railroad ownership. The lease of a car is equivalent to ownership. Private cars must have the full name of the owner or lessee painted or stencilled thereon or must be boarded with wooden, metal or cardboards, showing the full name of owner or lessee, and, if boarded, the cardboard must also show the initials and the number of the car and the date of shipment. The ownership as indicated by the marks or boarding on the car at the time tendered for unloading will govern. When the name of the lessee is painted, stencilled or boarded on the car, the car is exempt from demurrage for the lessee only. When the name of the lessee is not painted, stencilled or boarded on the car, the car is exempt from demurrage for the owner only.

Report of Committee on Railroad Business Mail

The Committee on Railroad Business Mail reported that present regulations for the handling of railroad business mail limit the weight of packages handled interline

to ten pounds, but owing to arrangements made by a large number of railroads whereby the Transcontinental Passenger Association established an agency for the distribution of folders, the Committee on Railroad Business Mail authorized the temporary handling of packages containing these folders and weighing not to exceed 60 lb. per package, although the average weight is very much less. This tentative arrangement has proved successful, and the committee recommended that the regulation be amended so as to permit a package of folders not exceeding 60 lb. in weight, to be handled interline. Under the proposed form, packages destined to other railroads will be limited to 10 lb., except that packages of folders not exceeding 60 lb. in weight may be handled interline, and with the further exception that where special arrangements are made by the interested carriers, packages of tariffs may be handled without limit as to the weight.

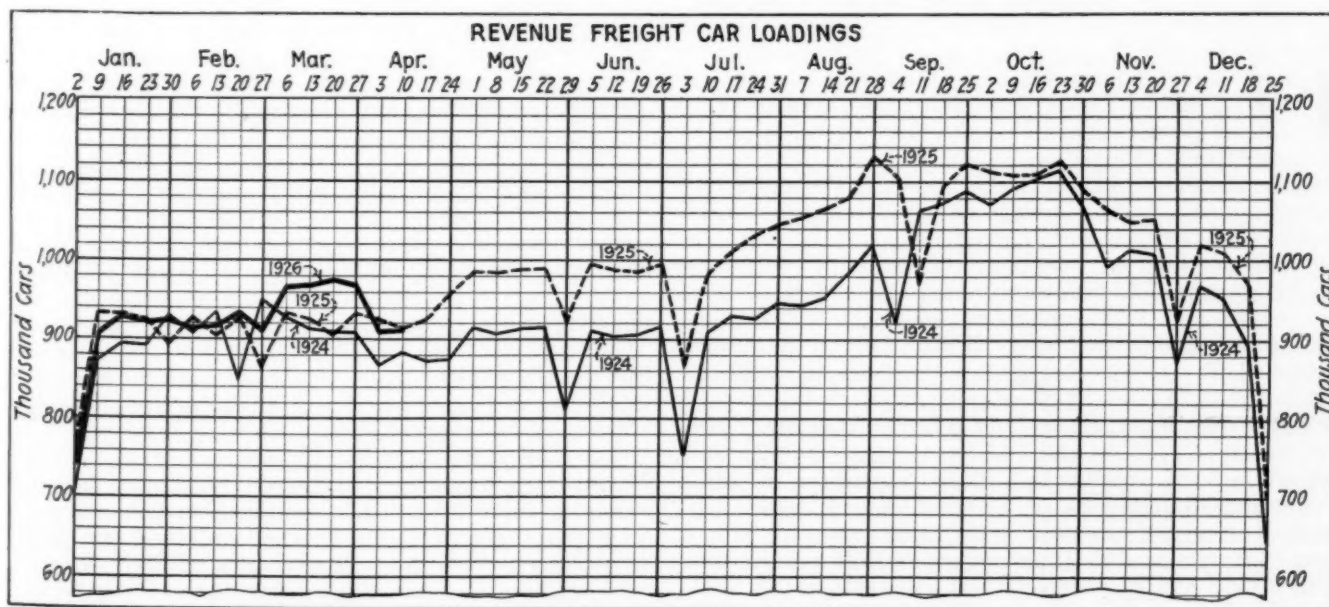
Report of Committee on Records

The Committee on Records reported on a number of matters previously covered by circulars and made recommendations and suggestions relating to the application of per diem rules, the movement of tank cars of private ownership and the equalization of loaded and empty mileage. The report also considered the carrying forward of the mileage balances when a tank car company or owner disposes of its tank car equipment, the empty movement of privately owned tank cars to shops for repairs, at the request of the owner, intermediate switching reclaims, and interchange reports.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended April 10 amounted to 929,506 cars, an increase of 11,106 cars as compared with the corresponding week of last year and an increase of 48,569 cars as compared with 1924. Increases as compared with last year were reported from all districts except the Southern, Northwestern, and Southwestern, and in all classes of commodities except livestock, forest products, ore and miscellaneous freight. The latter showed a decrease of 17,225 cars, while coal showed an increase of 24,890 cars.



The summary, as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT CAR LOADING—WEEK ENDING SATURDAY, APRIL 10			
Districts	1926	1925	1924
Eastern	227,687	220,211	217,890
Allegheny	191,897	191,159	187,427
Pocahontas	47,550	44,924	35,350
Southern	154,048	154,094	136,057
Northwestern	113,442	114,054	113,566
Central Western	124,347	121,969	129,328
Southwestern	70,535	71,989	61,313
Total Western districts	308,324	308,012	304,207
Total all roads	929,506	918,400	880,937
Commodities			
Grain and grain products	35,892	31,165	37,625
Live stock	24,901	25,516	27,768
Coal	163,497	139,007	127,704
Coke	12,689	11,296	11,814
Forest products	73,842	78,549	76,766
Ore	13,448	14,602	14,402
Mdse., I. C. L.	264,948	261,151	253,611
Miscellaneous	339,889	357,114	331,247
April 10	929,506	918,400	880,937
April 3	928,092	923,400	861,990
March 27	967,838	932,769	907,389
March 20	977,209	911,481	908,390
March 13	967,411	926,119	916,762
Cumulative total 15 weeks	13,843,196	13,624,209	13,330,938

The freight car surplus for the week ended April 7 averaged 274,219 cars, an increase of 27,670 cars as compared with the week before. This included 127,084 coal cars and 99,679 box cars. The Canadian roads for the same period had a surplus of 23,350 cars, including 19,700 box cars and 200 coal cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended April 10 showed little change as compared with the previous week and with the same week last year.

Commodities	Total for Canada			Cumulative totals to date	
	Apr. 10, 1926	Apr. 3, 1926	Apr. 11, 1925	1926	1925
Grain and grain products ..	4,702	4,646	4,466	94,120	90,851
Live stock	2,064	2,088	2,080	28,887	31,768
Coal	3,756	3,029	1,923	63,596	65,559
Coke	431	328	249	6,692	4,392
Lumber	3,664	3,365	3,331	45,687	42,371
Pulpwood	2,976	3,052	2,348	53,769	54,968
Pulp and paper	2,502	2,438	2,031	36,920	30,192
Other forest products	3,532	3,217	2,473	50,365	45,904
Ore	1,362	1,394	902	19,853	16,266
Merchandise, L. C. L.	16,566	14,880	14,596	209,789	200,526
Miscellaneous	12,156	11,743	10,702	156,991	143,692
Total cars loaded	53,711	50,180	45,101	766,669	726,489
Total cars received from connections	37,953	38,173	32,380	520,497	475,574

Ton-Miles and Passenger-Miles Per Man-Hour

WASHINGTON, D. C.

IN an article published in the Monthly Labor Review the Bureau of Labor Statistics of the Department of Labor gives computations to show that considering all employees engaged in railroad work—executives, officials, professional men, clerks, and all employees doing railroad work of whatever nature—96.03 tons of freight and 8.08 passengers were moved a distance of one mile per man per hour in 1924, as compared with 94.21 tons of freight and 7.82 passengers in 1923, and 88.62 tons of freight and 8.37 passengers in 1922. Eliminating executives, professional men, clerks, and all employees except those actually engaged in transportation 293.27 tons of freight and 24.67 passengers were transported one mile per man per hour in 1924 as compared with 290.36 tons of freight and 24.12 passengers in 1923, and 267.68 tons of freight and 25.29 passengers in 1922. Continuing the process of elimination and using only employees engaged in train work the results were 518.37 tons of freight and 43.60 passengers in 1924 as compared with 500.05 tons of freight and 41.53 passengers in 1923, and 480.86 tons of freight and 45.42 passengers in 1922.

"There is no way of apportioning aggregate hours in the above groups as between freight and passenger movement; hence the accomplishment of one hour covers both freight and passengers," the article says.

"Road freight employees, those employees actually handling the trains, not including yardmen, moved 1,070.05 ton-miles of freight per man per hour in 1924 as compared with 993.55 ton-miles in 1923 and 971.19 ton-miles in 1922. The figures for this group of employees represent the actual average freight ton-miles produced by them as no employees are included in the group whose time or any part of it is chargeable to the passenger department. The same is true of road passenger employees. They produced 305.69 passenger-miles per man per hour in 1924 as compared with 316.20 passenger-miles in 1923, and 304.63 in 1922.

"The following table shows the output, in ton and passenger miles, per man-hour, by specified groups of employees. The averages are computed from the basic data in the tables published with the article.

"The business of the railroads is to transport freight and passengers and the productive accomplishment of these two departments is therefore treated separately," the article says.

"Freight ton-miles, freight car-miles, revenue passenger-miles, and passenger car-miles, are the accepted units of production. These are given in round numbers. From the nature of the industry a very large number of the employees engaged in railroad work do not actually contribute directly to the ultimate production. For this reason, in addition to computing the production per man per hour for all employees combined, special attention has been paid to those employees actually engaged in transportation work."

ACCOMPLISHMENT, IN TON AND PASSENGER MILES PER MAN-HOUR, 1922 TO 1924, BY SPECIFIED GROUPS OF EMPLOYEES

Employee group	1922		1923		1924	
	Freight ton-miles	Passenger miles	Freight ton-miles	Passenger miles	Freight ton-miles	Passenger miles
All employees	88.62 and 8.37		94.21 and 7.82		96.03 and 8.08	
Transportation employees	267.68 and 25.29		290.36 and 24.12		293.27 and 24.67	
Train and engine employees	480.86 and 45.42		500.05 and 41.53		518.37 and 43.60	
Road freight employees	971.19		993.55		1,070.05	
Road passenger employees		304.63		316.20		305.69

"Railroad labor accomplishment, as measured in ton and passenger miles per man-hour, was computed from the reports of the Interstate Commerce Commission for the years 1922 and 1923 and the results published in the Labor Review for March, 1925. Data for the year 1924 have since become available, and the purpose of this article is to continue the comparison to include the figures for that year. While, as stated in the previous article, the Interstate Commerce Commission reports are not in sufficient detail to permit of a searching study of railroad labor accomplishment, they do furnish a basis for yearly comparison. The figures for any one year may not be mathematically exact, yet, as the same methods are applied to the figures for each year, this does not seriously affect the comparison as between the years.

"Also, it must be remembered in studying these data that the efficiency of many employees engaged in railroad work does not depend to any great extent upon their own efforts. This is especially true of those employed in the actual transportation of freight and passengers. Empty freight cars must be transferred from point to point, switching other than that by terminal companies must be done, passenger trains must be run on schedule although employees have no control over the number of people who wish to ride, and many other things must be done which enter into hours worked but not into production."

Report of Pneumatic Brake Tests

Quick service universal valve is tested on the Pennsylvania to determine its effect on rough handling

THE results of tests made several years ago by the Westinghouse Air Brake Company on the Pennsylvania with electro-pneumatic brake equipment on passenger trains running between New York and Washington, D. C., clearly demonstrated that improvements were possible in train slack control by the simultaneous and uniform application of the brakes throughout

The train was equipped with five recording instruments as follows:

First car—one combined speed indicator and recorder. One three-element trainograph which recorded locomotive brake cylinder pressure, first car brake cylinder pressure and the brake pipe pressure between the first car and tender.

Third car—A slack indicator was mounted and arranged to measure the slack movement between the second and third cars of the train.

Eighth car—A similar instrument was mounted on the eighth car and arranged to measure the slack movement between the seventh and eighth cars.

Tenth car—A three-element trainograph was installed on this car and arranged to record the brake cylinder, service reservoir and brake pipe pressures on the last car.

A switchboard and clock device were installed on the first car and wires were run throughout the train so that all the records could be co-ordinated with the time of the

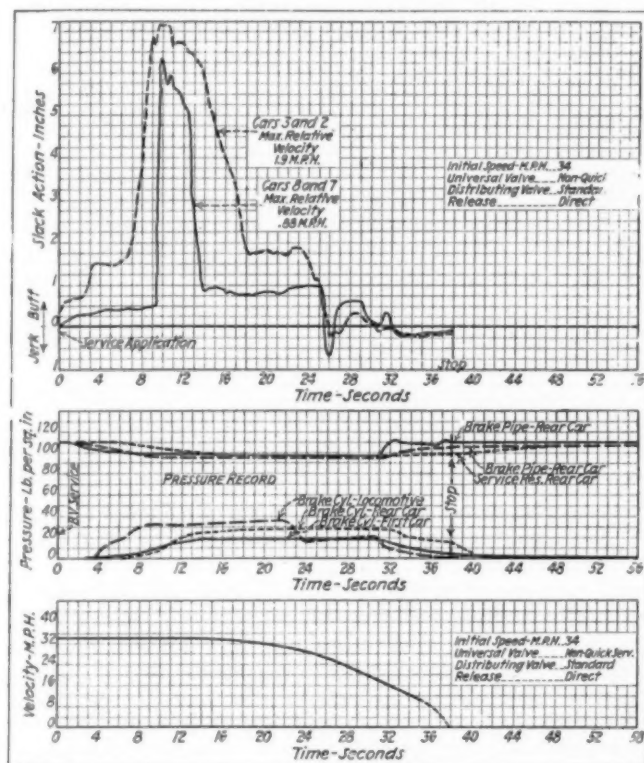


Fig. 1—Conditions Obtaining During Run Five While Making North Asbury, N. J., Station Stop

the train. Following this test a pneumatic equipment was developed, which accomplishes substantially equivalent results without the considerable extra expense of electro-pneumatic equipments and maintenance incidental to the use of such brakes.

This pneumatic equipment, known as the quick service universal valve, was tried out in a number of extensive tests conducted from July 29 to August 4, 1925, on the Long Branch division of the Pennsylvania. These tests were made on a train, running one north bound and one south bound trip per day, on a fast schedule, making a through run from Newark, N. J., to Redbank, a distance of 35 miles, and from there on making local stops to Point Pleasant, N. J., 20 miles further. The train was made up of eight 80-ft. coaches and two parlor cars. The coaches were equipped with one and the parlor cars with two 16-in. brake cylinders each. The universal valves on the cars and the distributing valve on the locomotive were provided with chokes to give the same application and release times for each vehicle.

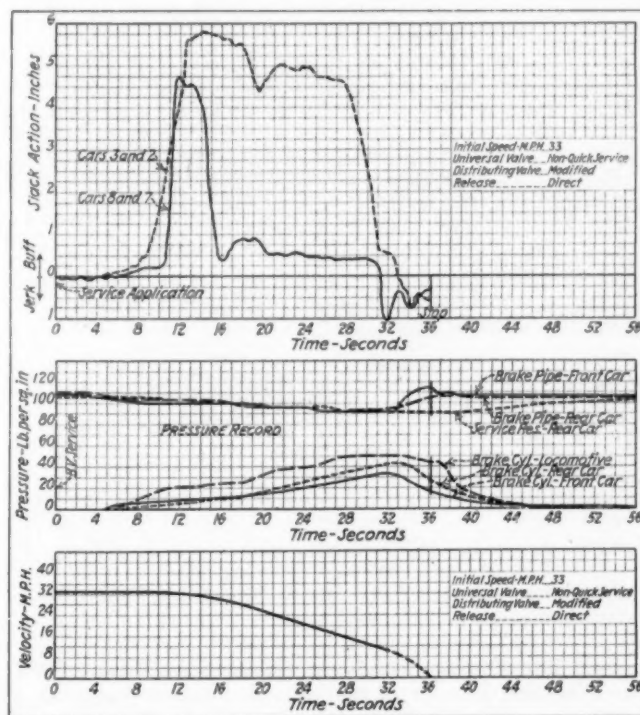


Fig. 2—Brake and Slack Action While Making a Station Stop During Run Three

brake valve movement for each test. A signal system for the control of instrument operation was also included in this arrangement. The locomotive brake valve quadrant was fitted with electric contacts and connected so that the brake valve movement at the start of each test could be recorded on each record of pressure and slack action taken in the train. The signal system was operated from the locomotive so that the instrument operators could be warned when a test was about to start.

The schedule of the tests is shown in the table. A

total of ten runs, or five round trips, were made between New York and Point Pleasant. The conditions which were set up for each run are shown in the table and curves have been plotted from the test records to illustrate the various comparisons which the test records afford. The runs are numbered in the order in which they were made. On runs five and six, where the distributing valve is designated as "standard," it was not modified to give the same application and release times as obtained on the cars. The total loose slack in the train, measured by pushing all the slack into the last car with the brakes set, and then moving ahead until the rear car just moved, was found to be 54½-in.

TABLE SHOWING THE SCHEDULE OF TESTS RUN BETWEEN NEW YORK AND POINT PLEASANT, N. J.

Run No.	Date	Universal valve	Distributing valve
1	July 29	Quick service—direct release	Modified
2	July 30	Quick service—gradual release	Modified
3	July 30	Non-quick service—direct release	Modified
4	July 31	Non-quick service—gradual release	Modified
5	July 31	Non-quick service—direct release	Standard
6	Aug. 1	Non-quick service—gradual release	Standard
7	Aug. 1	Quick service—direct release	Modified
8	Aug. 3	Quick service—gradual release	Modified
9	Aug. 3	Quick service—gradual release	Modified
10	Aug. 4	Quick service—gradual release	Modified

In Fig. 1 is shown a record of the brake action at the front and rear of the train. Train speed and slack action is also shown for the brake conditions which existed for run five at the North Asbury, N. J., station stop. The brake action curves show the locomotive brake cylinder pressure developed faster than that on the cars during

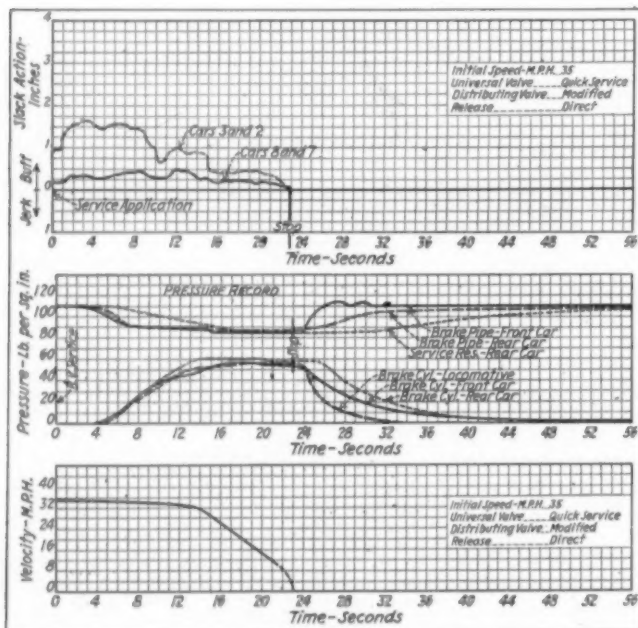


Fig. 3—A Stop During Run Seven, Showing the Effect of the Quick Service Feature of the Universal Valve, Together with the Modified Locomotive Brake, in Reducing Slack Action and Increasing the Retardation Rate

a service application and the first car brake began to apply a considerable time before the last car applied. The effect of this action was to cause a run-in of slack between cars three and two, a total movement of over seven inches, and likewise a somewhat less movement between cars eight and seven. Immediately after this run-in of slack occurred, the brake cylinder pressure at the rear of the train built up above that shown for the brake cylinder of car one. The greater braking power development in the rear of the train caused a run-out of slack which, while not severe, was sufficient to make the train handling

rough. The slope of the slack record curve between cars seven and eight reveals that a maximum difference of 0.88 m.p.h. existed between those two cars at the time of the run in. While such a difference in velocity was not great, it was of such a degree as to be objectionable.

The curves shown in Fig. 2, covering the North Asbury Park station stop during run three, are similar to those shown in Fig. 1 and described in a previous paragraph, except that the locomotive distributing valve was modified by the placing of chokes in the application and release ports in order to make the engine brake synchronize more nearly with the train. The brake pipe reduction in this test was somewhat greater but was made in steps which

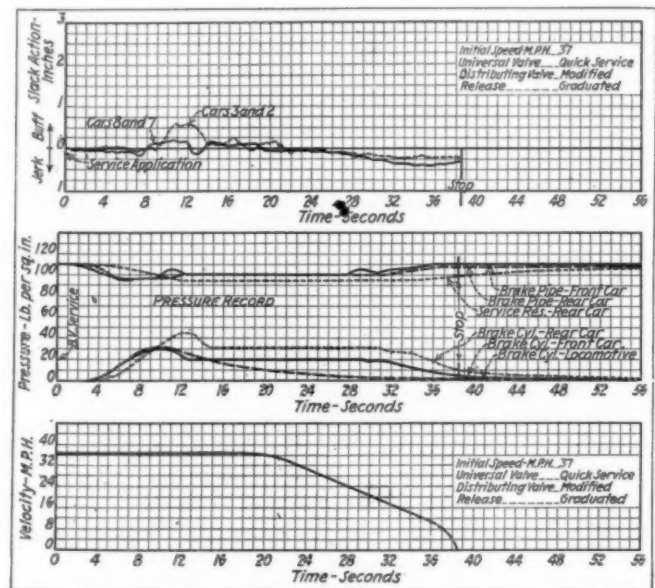


Fig. 4—In Run Nine, the Addition of the Graduated Release Increased the Smoothness at the End of the Stop

should reduce the tendency to slack action in the train. The slack curves in the top chart of Fig. 2 show that notwithstanding the slower brake pipe reduction and the modification of the engine brake a considerable slack action movement occurred between the cars. The total amount of slack movement and the maximum rate of movement were not as great as in the test previously described, but were still sufficient to be considered objectionable by the observers present. The maximum rate of speed difference between the vehicles occurred between cars seven and eight and was 0.341 m.p.h.

The curves shown in Fig. 3, covering the North Asbury Park station stop during run seven, are similar to those described in the preceding paragraph, except that in addition to the modification of the engine distributing valve, the quick service feature was cut in on all the car brakes. These curves show a more prompt accomplishment of the brake pipe reduction from the front to the rear of the train, and also a quicker and more uniform build-up of the brake cylinder pressure at the front and rear of the train, and on the locomotive. The slack indicator curves in the top chart in Fig. 3 show practically no slack action whatever and the observers on the train reported the stop as being very smooth.

A comparison between Figs. 1 and 3 shows distinctly the benefit of the modified distributing valve on the locomotive and the quick service feature on the cars in the way of smoother train handling combined with a decided gain in the rate of retardation for the service stop. With the latter, the comparison is evident from the velocity time curves. The maximum velocity difference between

the cars, shown by the slack indicator curves in Fig. 3, is so small as to be negligible.

The curves shown in Fig. 4, covering the North Asbury Park station stop made during run nine, are similar to those described in the preceding paragraphs, with the exception that the stop was made using graduated release, so that the brake cylinder pressures on the locomotive and train was low at the time of stopping, thus avoiding the lurching usually experienced at the end of a stop with high cylinder pressure. The full advantage of graduated release operation is not brought out in these curves, as the brake pipe reduction at the beginning of the stop was not heavy enough. Nevertheless this stop illustrates that graduated release can be accomplished with little or no train slack action, and the observers present were unanimous in their judgment that the stop was quite smooth. The maximum difference in velocity between the cars shown by these records for any point in the stop was so small as to be negligible.

An analysis of all the stops made, which were about 190, shows a decided difference in the slack action recorded between the train operating with non-quick service equipment and that operating with the quick service fea-

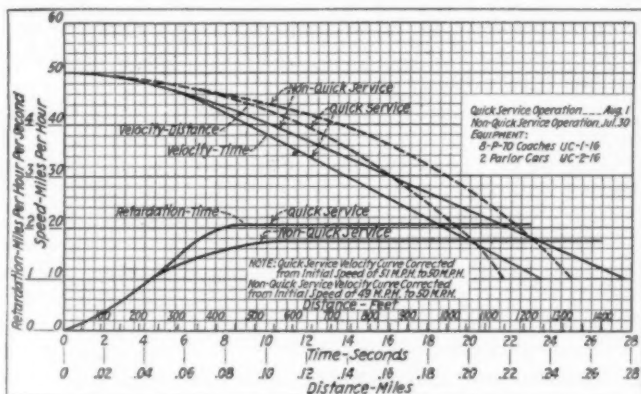


Fig. 5—A Comparison Showing the Effect of the Quick Service Feature of the Universal Valve in Increasing Retardation

ture. The stops made without the quick service feature operative show an average slack movement at the slack indicator locations of 4.36 in. with a maximum of 8.8 in. and a minimum of .42 in. The stops made with quick service cut in show an average movement of the slack indicator locations of 1.51 in. with a maximum of 4.6 in. and a minimum of .18 in. The ratio of these averages is nearly three to one. It should be borne in mind that a comparison with the average does not show the full advantage of the improved brake, as the degree of shock or rough handling increases in more than direct proportion to the increase in the amplitude of the slack movement. This comparison would be further accentuated if the chokes controlling application and release of air in the car brake cylinder had not been used for both the non-quick service and quick service conditions.

Further, the average relative velocity difference between cars at the slack indicator locations is found to be 0.27 miles per hour, with the quick service feature cut out, and 0.13 miles per hour with quick service in use. The minimum relative velocity in each case was 0.02 m.p.h. while the maximum values were 1.42 m.p.h. and 0.82 m.p.h. for non-quick service and quick service, respectively. Although the maximum relative velocity difference of 1.42 m.p.h. is not sufficient to damage equipment, it is of such value as to be objectionable.

It was the opinion of the observers that the train handling with the quick service cut in was smooth on all

stops, without exception. It was possible occasionally to make smooth stops with the standard condition, but slack action sufficient to be designated as objectionable was experienced in the majority of stops made under those conditions. These facts are supported by all of the test records.

The curves shown in Fig. 5 are the speed-time and speed-distance curves for typical train stops made at the Little Silver, N. J., station. This chart also shows retardation-time curves and gives a comparison between the train without quick service and that with the quick service cut in. These curves were worked up from the speed recorder charts and show a considerable gain in retardation in favor of the quick service feature of the car brakes. The speed recorder record was such that it could not be depended upon for accuracy of speeds below 10 m.p.h. However, the general direction of the curves shows that for the stops made at Little Silver from an initial speed of 50 m.p.h., there was a gain of about 8 sec. in time and 100 ft. in distance in favor of the quick service brake.

A complete analysis of the entire test indicates that the following conclusions are warranted:

1—That the universal valve with the quick service feature reduces the time required for service brake propagation to about one-half.

2—That the modification of the locomotive equipment so as to retard the rate of build-up and release of brake cylinder pressure during service application to more nearly synchronize with that of the car brakes, is essential.

3—That the chokes used to control the rate of application and release of the car brake cylinder pressures are an essential factor in the uniform development of the brake application and release on the train as a whole.

4—That the locomotive brake modification, the universal valve quick service feature, and the brake cylinder application and release chokes combine to produce a smooth handling train with the proper brake valve manipulation. Everything else being equal, smoother train operation must result from these changes.

5—That this gain in smooth handling is accomplished without sacrifice of time or distance in the stop. On the contrary, the records show a decided gain of time and distance along with the smoother handling.

6—That with the above equipment operated in graduated release, the average engineman can destroy the reaction of the trucks at the instant of stop with the exercise of less skill. It follows that the degree of train reaction at the stop will be greatly reduced.

Railroad Bills in Congress

WASHINGTON, D. C.

ALTHOUGH it is generally conceded that there is little prospect of action at this session of Congress on any railroad bills not already on the calendar, and not much prospect for some that have reached that stage, the Senate committee on interstate commerce is trying to hold hearings on or otherwise dispose of the bills which have been referred to it, particularly those that are considered as campaign material for some of its members facing an election.

A hearing was begun on April 20 on the bill to abolish the Pullman surcharge, introduced by Senator Robinson. A. M. Loeb, chairman of the ways and means committee of the National Council of Travelling Salesmen's Associations, made a brief statement for the bill but said he had no witnesses to present. He filed for the record copies of speeches on the bill made by Senator Robinson and Representative McLaughlin. Henry Wolf Bikle, general attorney of the Pennsylvania, attempted to give a brief statement in opposition to the bill, based mainly on the testimony taken by the Interstate Commerce Commission in the surcharge case, but he made little progress in the face of interruptions by Senator Smith and others who are so convinced of the "injustice" of the surcharge

that they showed little interest in statistics bearing on the matter. Mr. Bikle showed that the surcharge has at least not caused a reduction in Pullman travel, by citing figures showing an increase in the Pullman revenues since 1920, whereas railroad coach traffic in that period has shown a falling off.

R. N. Van Doren, vice-president and general counsel of the Chicago & North Western, appearing for the western roads, sought to urge upon the committee the unwisdom of attempts to regulate railway rates through Congressional action. He said that no better illustration than this bill could be afforded of the impossibility of a committee that can give but scant attention to the subject reaching a proper conclusion on a matter that an expert body like the Interstate Commerce Commission felt it necessary to take two years to consider, with protracted hearings and a mass of testimony and exhibits. He said it is true that the commission exercises powers delegated to it by Congress but that a policy by which Congress should seek to take out of the hands of the commission matters on which it has reached a conclusion that Congress does not agree with would be likely to undermine the whole system of regulation. Congress went as far as it should, and some say farther than it should, when it passed the Hoch-Smith resolution, Mr. Van Doren said, but even that did not direct the commission to take any specific action as to any particular rates.

Mr. Van Doren also discussed the revenue aspects of the situation, saying that of the \$39,000,000 collected from the Pullman surcharge in 1925 the western roads received \$16,000,000, and that if that amount were to be taken from them they would be obliged to ask for a greater increase in freight rates than they are now asking from the commission. He pointed to the position of the western state commissions that the roads ought to get the increased revenue they need from passengers rather than from freight and said that to eliminate the surcharge would merely aggravate the situation they are faced with respecting their passenger business.

On April 19 the Senate committee ordered favorable reports on two bills without even the formality of holding hearings on them, except to the extent of hearing for a few minutes the Senators who had introduced the bills, without notice to those who had asked to be heard in opposition. These were the bill introduced by Senator Harris of Georgia, S. 951, to make it unlawful to use "a car other than a steel or steel underframe car, between steel cars or steel underframe cars, or in front of any steel car or steel underframe car, in any train used in whole or in part for the transportation of passengers." A similar bill was passed by the Senate at the last session.

The other bill was S. 1344, introduced by Senator Sheppard of Texas, to make the initial carrier liable for loss or damage to freight shipments when transported on a through bill of lading "when property so transported on a through bill of lading is reconsigned or diverted in accordance with the applicable tariffs." Senator Gooding presented the report to the Senate on this bill, saying in part:

The purpose of the bill is to extend the existing liability of the initial carrier for loss, damage, or injury to property transported on a through bill of lading by two or more carriers to cases where the final destination has been changed by the shipper while the property is en route. Since the adoption of the Carmack amendment to the interstate commerce act many years ago the shipper has had the right to hold the initial carrier on a through bill of lading responsible for loss or damage occurring to the shipment on any line participating in the haul. This right has been of great value to shippers and to commerce in general and the railroads soon adjusted themselves to the situation. With the rapid increase of our population, especially the population of great cities, and the development of a vast and varied demand for articles of consumption, especially fruits and vegetables, with the growing number and value of shipments for long distances from areas of production

to areas of consumption over connecting lines, it frequently happens that after a car of produce has started on its way a better market develops at some other consuming center than that of original destination. In such cases the shipment is reconsigned and diverted by wire to a new destination, but if damage or loss occurs after the reconsignment or diversion the shipper may no longer look to the first carrier, but is put to great expense and inconvenience in endeavoring to adjust damages at a point remote from place of production. This means a distinct burden and a handicap on commerce. The committee feels, therefore, that the principle of the existing law is adapted to present conditions by this bill and that it should pass.

Chairman Watson of the Senate committee on April 16 submitted to the Senate a new report from the committee on the railroad labor bill, in the form it was passed by the House as H.R. 9643. The bill had been reported to the Senate originally on February 26 and Senator Watson merely repeated the original report, without even mentioning the two amendments made by the House. The bill is expected to be taken up in the Senate at the conclusion of the discussion of the public buildings bill.

F. H. Alfred, president of the Pere Marquette, J. E. Gorman, president of the Chicago, Rock Island & Pacific, and C. N. Whitehead, president of the Missouri-Kansas-Texas, called on the President at the White House on April 19 and left with him a memorandum setting forth the views of the railway executives who oppose the Watson-Parker bill. It is understood that the President let it be known that he would consider the objections when the bill reaches him.

Senator Smith of South Carolina made a speech in the Senate on April 15 "to object to the proposed legislation for the relief of the railroads," referring to the Gooding interest rate bill, because the committee on banking and currency had not reported his bill to appropriate \$5,000,000 to be placed in land banks for the relief of the farmers. He said that the railroad bill was proposed "perhaps rightfully" but that if action on his bill is not taken he proposed to add it to the railroad bill.

Those interested in Senator Fess' bill of lading bill, S. 91, have been informed that it has been decided to lay the bill aside on the ground that there is no chance for its consideration at this session of Congress. Hearings on a similar bill, requiring carriers to issue a "clean" bill of lading, have been held before the House committee on interstate and foreign commerce, which has disapproved the bill.

The Senate on April 15 adopted a resolution proposed by Senator Gooding providing for the appointment of a special assistant clerk for the committee on interstate commerce at \$2,500 a year, rejecting an amendment proposed by the committee which would have substituted "a special clerk who shall be a rate expert, skilled in matters relating to railroad transportation," at \$7,000 a year. Senator Gooding said that after further consideration the committee asked that the amendment be rejected.

Hearings on the Northern Pacific land grant controversy were resumed on April 14 by the joint committee appointed at the last session of Congress to investigate the matter. Testimony was given by D. F. McGowan, attorney for the Forest Service.

Alfred P. Thom, general counsel of the Association of Railway Executives, appeared in opposition to the bill on April 21. He argued against the idea of a Congressional committee trying to deal with such a subject, saying that it might reach just as good a conclusion as the Interstate Commerce Commission if it were prepared to devote a year and a half to the subject, as the commission had, but not in a day and a half. He also said that if this \$40,000,000 of surcharge revenue were taken from the railroads they would have to make it up somewhere else and the time when rates could be further reduced for the farmers would be delayed that much. He was to be heard further on the following day.



Northern Pacific Locomotive 1844 Arriving at Twin City Terminals with Tonnage Train from the Pacific Coast

Freight Engine Makes Record Run

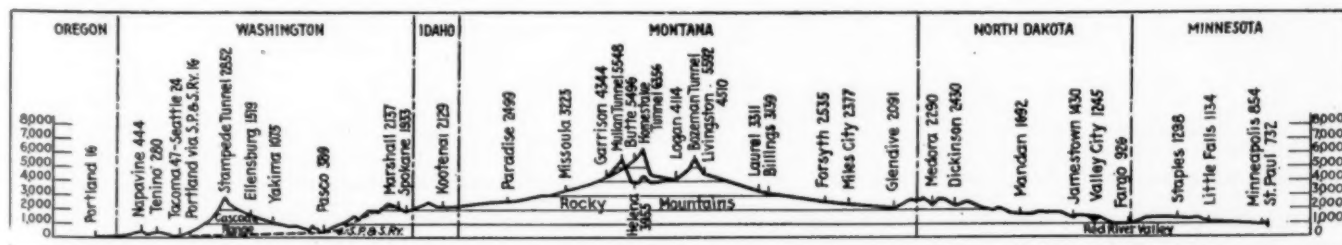
Northern Pacific coal-burning locomotive operates 1897.6 miles without uncoupling from tonnage train

As noted in a recent news item in the *Railway Age*, the Northern Pacific has recently made a record breaking continuous freight run in which a Mikado type coal-burning locomotive hauled a train from the Seattle, Wash., freight terminals of this road to the Twin Cities freight terminals without being disconnected from the train or receiving any terminal attention en route. The distance of 1,897.6 miles over three mountain ranges with maximum grades of 2.2 per cent was covered in 109 hours and 30 minutes total time, making an average speed of 17.4 miles per hour. The total terminal delays aggregated 4 hours and 43 minutes which was an average of 19 minutes at each terminal.

Locomotive 1844 used on the run was taken out of

tions being made from the rear of the train in accordance with grade conditions. Over one district 200 tons in excess of the standard rating was handled and 400 excess tons were handled over another district. The train load varied from 1,600 to 4,000 tons and consisted of 84 loaded cars on the last 500 miles of the run east of the Missouri river. For the entire trip the average number of loaded car miles per train mile was 71.8; total train journal miles, 1,127,956.8; total gross ton-miles, 6,574,518.2; and gross ton-miles per train-hour 60,041.2.

Locomotive 1844 is of the Mikado type, of 57,100 lb. tractive force, and equipped with a stoker, a trailer booster, a superheater, a feedwater heater, a type of table grate having 1/2-in. circular openings with a total air



Profile of Part of the Northern Pacific Line Over which the Long Freight Locomotive Run Was Made

pooled freight service where it had been operating steadily for five months. No special repairs were made in preparation for the trip; no time was spent giving attention to the fire or ashpan at terminals, and no mechanical difficulties were encountered en route. The run was an endurance demonstration designed to stimulate the study of coal-burning locomotive operation without the expense and delay of unnecessarily changing locomotives at intermediate terminals.

The locomotive was loaded to at least its full standard tonnage rating over each division, additions and reduc-

opening of 13 per cent, and the usual modern devices for increasing the capacity and efficiency of a steam locomotive.

The following table gives a few of the important dimensions of Engine 1844.

Cylinders, diameter and stroke.....	28 in. x 30 in.
Boiler pressure.....	180 lb.
Weights in working order:	
On drivers.....	251,000 lb.
Total engine.....	341,500 lb.
Engine and tender.....	543,800 lb.
Diameter of drivers.....	63 in.
Heating surfaces:	
Firebox	327 sq. ft.

Tubes and flues.....	3,265 sq. ft.
Total evaporating.....	3,592 sq. ft.
Superheating.....	845 sq. ft.
Combined total.....	4,860 sq. ft.
Grate area.....	70.3 sq. ft.
Rated tractive force:	
Engine.....	57,100 lb.
Engine and booster.....	68,100 lb.

It is estimated that a total of 353 tons of coal and 442,000 gal. of water were consumed on the trip, the coal and water being served to the locomotive from main line coal docks and stand pipes.

An interesting feature of the trip was the use of four different types of coals which differed radically from each other in burning characteristics and in chemical composition. An approximate chemical analysis of the different coals follows:

Kind of coal	Moisture	Volatile	Fixed carbon	Ash	B. t. u.
Eastern screenings....	4.72	35.21	53.35	6.72	13,255
Rosebud coal.....	25.80	28.50	37.13	8.57	8,487
Red Lodge coal.....	10.15	34.79	41.93	13.13	10,159
Rdsllyn coal.....	4.74	35.31	41.32	18.63	11,161

The Rosebud coal, a lignitic coal of Montana, was used over 700 miles of the run. A single drafting arrangement of the locomotive permitted the use of each coal with equal facility. The 38 tons of ash produced were disposed of by opening the ashpan while the locomotive was passing over regular cinder dumping locations, and there was accordingly no necessity for placing the locomotive on cinder pits en route.

A striking accomplishment of the run was the proper maintenance of the fire without terminal attention and

condition at all times. The run demonstrated that not only could this be successfully accomplished but that the fire could be properly maintained with less labor than is required in the regular way with standard grates. This demonstration clearly illustrated that a locomotive fire with such clinkering and non-clinkering coals as are used on the Northern Pacific may be kept in first class condition practically indefinitely, without delays occasioned by terminal attention.

Water of a foaming character was supplied to the locomotive on several divisions but the concentration was controlled by the proper use of blow-out cocks and no trouble was experienced. The accumulation of sediment in the boiler was remarkably small, due largely to the frequent use of three blow-off cocks, one on each side of the boiler and one in front in the usual location near the mud ring.

The accompanying table gives a detail record of the performance of the test train showing the number of cars, tonnage, running time, terminal delay and total time at each point. It will be noted that while the terminal time for tonnage changes averaged 19 minutes per terminal, the minimum time was 7 minutes at Forsyth and the maximum was 45 minutes at Mandan.

There were no hot boxes or defective conditions developed on the locomotive or cars on the entire trip. Therefore, no repairs of any kind had to be made en route, and upon close inspection after arrival of the train

PERFORMANCE OF TEST TRAIN LEAVING SEATTLE, WASH., AT 10:30 A. M., MARCH 18, 1926, ARRIVING IN ST. PAUL, MINN., AT 2 A. M., MARCH 23

		March	No. of cars	Tonnage handled	Running time	Terminal time	Total time
Seattle, Wash.	Lv. 10:30 a. m.	18	36	1,571	6 hr. 40 min.	.....	6 hr. 40 min.
Ellensburg, Wash.	Ar. 5:10 p. m.	..	80	3,828	.....	14 min.	6 hr. 54 min.
Pasco, Wash.	Ar. 1:12 a. m.	19	..	..	7 hr. 48 min.	.....	14 hr. 42 min.
Pasco, Wash.	Lv. 1:27 a. m.	..	65	3,080	.....	15 min.	14 hr. 57 min.
Spokane, Wash.	Ar. 10:35 a. m.	..	..	..	9 hr. 8 min.	.....	24 hr. 5 min.
Spokane, Wash.	Lv. 10:58 a. m.	..	74	3,407	.....	23 min.	24 hr. 28 min.
Paradise, Mont.	Ar. 8:55 p. m.	..	..	..	9 hr. 57 min.	.....	34 hr. 25 min.
Paradise, Mont.	Lv. 10:10 p. m.	..	74	3,407	.....	15 min.	34 hr. 40 min.
Missoula, Mont.	Ar. 4:30 a. m.	20	..	..	6 hr. 20 min.	.....	41 hr. 0 min.
Missoula, Mont.	Lv. 4:55 a. m.	..	63	2,896	.....	25 min.	41 hr. 25 min.
Helena, Mont.	Ar. 2:40 p. m.	..	..	..	9 hr. 45 min.	.....	51 hr. 10 min.
Helena, Mont.	Lv. 2:55 p. m.	..	83	3,824	.....	15 min.	51 hr. 25 min.
Livingston, Mont.	Ar. 12:01 a. m.	21	..	..	9 hr. 5 min.	.....	60 hr. 30 min.
Livingston, Mont.	Lv. 12:30 a. m.	..	83	3,824	.....	30 min.	61 hr. 0 min.
Billings, Mont.	Ar. 6:35 a. m.	..	..	..	6 hr. 5 min.	.....	67 hr. 5 min.
Billings, Mont.	Lv. 6:50 a. m.	..	83	3,824	.....	15 min.	67 hr. 20 min.
Forsyth, Mont.	Ar. 11:25 a. m.	..	..	..	4 hr. 35 min.	.....	71 hr. 55 min.
Forsyth, Mont.	Lv. 11:32 a. m.	..	83	3,824	.....	7 min.	72 hr. 2 min.
Glendive, Mont.	Ar. 3:51 p. m.	..	..	..	4 hr. 19 min.	.....	76 hr. 21 min.
Glendive, Mont.	Lv. 4:20 p. m.	..	39	1,699	.....	29 min.	76 hr. 50 min.
Dickinson, N. D.	Ar. 9:40 p. m.	..	..	..	5 hr. 20 min.	.....	82 hr. 10 min.
Dickinson, N. D.	Lv. 9:50 p. m.	..	45	1,999	.....	10 min.	82 hr. 20 min.
Mandan, N. D.	Ar. 3:15 a. m.	22	..	..	5 hr. 25 min.	.....	87 hr. 45 min.
Mandan, N. D.	Lv. 5:00 a. m.	..	84	3,800	.....	45 min.	88 hr. 30 min.
Jamestown, N. D.	Ar. 10:45 a. m.	..	..	..	5 hr. 45 min.	.....	94 hr. 15 min.
Jamestown, N. D.	Lv. 10:55 a. m.	..	84	3,800	.....	10 min.	94 hr. 25 min.
Fargo, N. D.	Ar. 3:07 p. m.	..	..	..	4 hr. 12 min.	.....	98 hr. 37 min.
Fargo, N. D.	Lv. 3:15 p. m.	..	84	3,800	.....	8 min.	98 hr. 45 min.
Staples, Minn.	Ar. 8:55 p. m.	..	..	..	5 hr. 40 min.	.....	104 hr. 25 min.
Staples, Minn.	Lv. 9:17 p. m.	..	84	3,800	.....	22 min.	104 hr. 47 min.
St. Paul and Minneapolis.	Ar. 2:00 a. m.	23	..	..	4 hr. 43 min.	.....	109 hr. 30 min.
Average terminal time.....	..	..	..	..	104 hr. 47 min.	4 hr. 43 min.	109 hr. 30 min.
Total time.....	..	..	..	..	.....	19 min.	.....

without delay. The ease with which the fire was maintained was indicated by the fact that the suggestions of the supervising officer were sufficient to permit the fire to be carried in the desired thin depth of four inches or less, even though each engine crew may not have been entirely familiar with the use of that particular type of locomotive or grate. Sixteen different engine crews, who were first out in chain gang service, took their turn in running and firing the locomotive over their respective districts.

The traditional plan of cleaning the fire when it became dirty was not followed on this run, being rendered unnecessary by success in preventing the development of a dirty fire condition. With the use of the grate described, the fire was given attention only while the locomotive was being operated, and was so kept in first class

at the end of the run, there was nothing found on the locomotive or any of the cars that required repairs or mechanical attention.

The success of this run was the result of the excellent mechanical condition of the equipment, careful plans on the part of both the operating and mechanical departments and the thorough co-operation of the engine and train crews.

THE SOUTHERN, to assist manufacturers and exporters to capture a larger share of the trade of Porto Rico, has sent its South American agent, E. D. Stratton, to make a thirty-day business tour of the island. The people of Porto Rico bought merchandise to the value of \$78,000,000 in the United States in 1925 and good crop prospects promise a larger trade in 1926.

Train Control Installations Approved

WASHINGTON, D. C.

IN two reports by Division 1 made public on April 21 the Interstate Commerce Commission approved, with certain exceptions, the installations of the three-speed continuous induction automatic train control system of the Union Switch & Signal Company on the Atlantic City Railroad of the Reading Company and the New Jersey Southern division of the Central of New Jersey.

The Atlantic City installation inspected and tested was completed on December 31, 1924, and placed in regular service April 1, 1925. It extends from Camden to Atlantic City, N. J., 55.2 miles, of which 52.6 miles is double track and 2.6 miles three-track. There are 52 locomotives equipped with the device. The cost of this installation, as reported by the carrier, covering wayside and locomotive equipment, is as follows:

1. Total cost of the train control installation less power lines, power apparatus, signals and cost of change in existing signal system, less salvage.....	\$428,680.08
2. Total cost of power lines and power apparatus for train control, less salvage.....	58,319.35
3. Total cost of signal system installed in connection with train control, less salvage.....	20,301.22
4. Total cost of change in existing signal system made necessary by train control, less salvage.....	73,891.98
5. Total all other costs.....	295,553.85
Total cost of the installation.....	\$876,746.48

As a result of this inspection and test, it was found that the installation meets the requirements of the specifications and order of the commission, except as noted below, and it, therefore, is approved, except as hereinafter indicated:

1. The automatic cut-in feature, as installed, is designed and operated upon the open circuit principle, and while the cab indication is intended to apprise the engineer of a failure of the device to cut-in automatically, it involves reliance upon the human element, and where necessary to depend upon it, should be supplemented by such additional check as may be practicable.

The Reading Company is expected to comply at once with the following requirements as to maintenance, tests, and inspection:

1. Instructions, reports and records in effect at the time of the inspection relative to tests of locomotive and roadway apparatus should be consistently observed and continued; all reports to be made on forms provided for that purpose and regularly forwarded by the inspectors to a designated officer.

2. No evidence was found during the inspection of the influence of foreign current upon the locomotive equipment, and it was stated that the influence previously noted had been fully eliminated. There are, however, 29 commercial power lines crossing the railway between Camden and Atlantic City, and three paralleling it, and the matter is mentioned here inasmuch as, should trouble of this nature develop again, it would be necessary to employ adequate means for overcoming it promptly.

3. Such pneumatic portions of this device containing the functional parts essential to brake application as are located outside of the cab, must be protected adequately against freezing because if these valves should be sealed closed in normal position the result might be serious. While the results obtained with the protection now applied appears to have been satisfactory so far, it is not felt that the experience obtained has been extensive enough to be conclusive, and the matter should continue to have close attention.

4. It was stated that the low-speed limit of 25 miles per hour was the lowest limit practicable with the density of traffic and the high speeds which characterize this line and that this limit was decided upon after a fair trial of that of 20 miles per hour, and because of the prohibitive limitation of track capacity which the 20 mile limit imposed. This 25 mile low-speed limit is higher than obtains on any other installation so far inspected and it is passed with the caution that it be closely watched in practical operation until it has been demonstrated that it meets the intent of the term "low speed restriction" as used in paragraph 2, under the heading "Functions," in our specifications and requirements.

The attention of the Reading Company is directed to the following items with respect to signals and related matters:

1. The loop circuit controls at signals A and B on signal bridge

C at KR tower, at Hayes Branch crossing, and at Signal 1 Atlantic City drawbridge, should be so installed as to be controlled through track delays or the equivalent.

2. Consideration should be given to possibly increased protection to be secured through the installation of separate sectionalized northward and southward direct current commons.

3. The type of fouling protection employed should be given careful consideration with a view to possibly providing increased protection in connection therewith.

The Reading Company is expected to promptly and currently inform us as to the progress made in conforming to all of the above-stated requirements and recommendations.

The Central of New Jersey installation was completed October 28, 1925. It extends from Red Bank to Winslow Junction, N. J., 65.5 miles, single track, and there are 30 locomotives equipped. The cost figures are given as follows:

1. Total cost of train control installation, less cost of power lines, power apparatus, signals and cost of change in existing signal system, less salvage—	
Roadside.....	\$131,063.39
30 locomotives equipped.....	108,416.50
Control line wires on Western Union poles, one-third of cost of 6 wires.....	9,181.23
Test track.....	6,059.29
	\$254,720.41
2. Total cost of power lines and power apparatus for train control, less salvage—	
Labor and materials.....	56,768.87
3. Total cost of signal system installed in connection with train control, less salvage—	
Signals.....	226,860.02
Two-thirds cost of control line wires on Western Union poles.....	18,351.83
Signal labor and material.....	27,950.89
	\$273,162.74
4. Total cost of change in existing signal system made necessary by train control, less salvage—	
Signals.....	179,418.93
Salvage 77 poles and cases.....	7,700.00
	\$171,718.93
Total cost.....	\$756,370.95

Attention is directed to the necessity for maintaining a proper standard of maintenance for the headlight generators used in connection with the train control system so as to prevent low resistance grounds and poor commutator conditions. This is declared to be of especial importance on those locomotives which are equipped with one 500-watt generator, upon which the combined load for train control and lighting is about 460 volts, requiring more than 150 lbs. of steam to maintain the generator's rated voltage.

The attention of the Central Railroad Company of New Jersey is directed to the following items with respect to signals and related matters:

1. Safety of operation might be increased by providing a B point, westbound in the block of signal R-1031, at braking distance for medium speed from the "End of Block" sign located at Signal R-1042; the low speed restriction between the B point and "End of Block" to be effective when:

(a) The main track is occupied between the B point for signal R-1042 and the latter signal, and also when:

(b) The crossover switches just west of signal R-1042 (and End of Block sign) are set for a movement between the main line and the eastward siding from which the Atlantic City Railroad connection is made.

2. The temporary wires noticed on the ground or tacked to the ties should be checked to insure that they do not cause undesirable and possibly unsafe conditions pending their removal.

3. If the present cut-out circuits are to be retained, they should be installed so as to conform to the standards employed in the permanent installation and adjusted for the proper current values. The plans should be revised accordingly.

4. It appears that the emergency power supply facilities are inadequate for the proper operation of the system as installed. On February 3, 1926, the power for the entire train control and signal system was off for sixteen minutes while repairs were being made at Red Bank sub-station.

The Central Railroad Company of New Jersey is expected to promptly and currently inform us as to the progress made in conforming to all of the above stated requirements and recommendations.

Material and Supplies Carried by Railways
 RATIO OF QUANTITIES ON HAND AT CLOSE OF 1924 AND FOR FIVE YEARS ENDING 1924 TO ANNUAL OPERATING EXPENSES AND TO NORMAL SUPPLY

Railroads	Year 1924					Five years—1920 to 1924 incl.				
	Annual operating expenses	Stock on hand Dec. 31	Per cent ratio	Normal supply	Excess supply	Sum of annual operating expenses	Sum of stocks on hand Dec. 31	Per cent ratio	Normal supply	Excess supply
Chicago, Great Western.....	\$20,238,411	\$1,190,471	5.88	\$1,938,471	—\$187,000	\$111,032,044	\$8,941,051	8.05	\$10,636,951	—\$1,695,000
Cincinnati, Indianapolis & Western.....	3,760,199	228,261	6.04	3,762,261	—14,000	20,551,829	1,053,233	7.74	2,975,233	—2,924,000
Wheeling & Lake Erie.....	14,410,223	998,132	6.93	1,380,132	—382,000	68,221,048	7,082,240	10.18	2,515,240	—1,737,000
Bessemer & Lake Erie.....	794,486	79,486	6.93	1,091,486	—297,000	99,124,442	4,848,000	7.36	12,968,000	—12,968,000
Chicago & Alton.....	23,893,469	1,717,996	7.19	2,288,996	—571,000	137,711,458	6,965,429	7.88	32,508,429	—3,595,000
Delaware, Lackawanna & Western.....	64,485,909	4,871,979	7.56	6,177,979	—1,306,000	339,138,186	26,738,138	10.28	32,538,138	—5,800,000
St. Louis-San Francisco.....	64,092,011	4,950,647	7.72	6,140,647	—1,190,000	346,930,614	37,438,138	10.28	31,550,647	—5,882,000
Detroit, Toledo & Ironton.....	7,622,618	592,864	7.77	770,864	—18,000	32,884,345	3,722,000	11.62	3,722,000	—
Central Vermont.....	6,988,763	623,389	8.10	669,389	—13,000	35,081,342	3,722,000	11.62	3,722,000	—
Pittsburgh & West Virginia.....	2,901,327	235,315	8.11	278,315	—17,000	14,575,969	1,653,322	11.36	2,483,322	—1,840,000
Wabash.....	50,298,418	4,198,487	8.34	4,918,487	—720,000	259,240,479	24,236,287	9.34	24,835,287	—619,000
Hocking Valley.....	13,178,503	1,138,725	8.64	1,262,725	—124,000	65,486,654	9,885,667	14.64	6,242,667	—3,643,000
Toledo, Peoria & Western.....	1,754,750	155,192	9.07	1,684,192	—70,000	6,866,654	9,885,667	14.64	6,242,667	—3,643,000
Chesapeake & Ohio.....	82,781,703	7,495,272	9.05	7,930,272	—435,000	372,357,107	48,446,138	13.02	35,651,138	—12,705,000
Lehigh & Hudson River.....	2,240,096	203,425	9.08	214,425	—11,000	11,585,753	1,343,107	11.83	1,343,107	—
Long Island.....	26,680,854	2,631,329	9.86	2,556,329	—75,000	131,985,583	10,948,347	8.33	11,888,347	—840,000
Cleveland, Cincinnati, Chicago & St. Louis.....	26,740,728	6,727,740	10.09	6,393,740	—334,000	344,495,370	35,442,207	10.59	32,692,207	—2,750,000
Chicago & Eastern Illinois.....	22,433,256	2,341,393	10.43	2,160,393	—181,000	111,530,957	10,948,347	8.33	11,888,347	—840,000
Seaboard Air Line.....	41,387,634	4,323,995	10.45	3,964,995	—359,000	231,300,380	23,128,000	10.57	16,647,000	—7,481,000
Illinois Central.....	117,844,723	12,423,757	10.54	11,289,757	—1,134,000	600,437,070	78,521,562	13.27	19,435,562	—19,513,000
Michigan Central.....	62,159,524	6,640,876	10.68	6,254,876	—386,000	319,207,070	78,521,562	13.27	19,435,562	—19,513,000
Chicago, Milwaukee & St. Paul.....	125,550,061	13,575,288	10.80	12,228,288	—1,347,000	682,600,008	11,356,459	12.95	20,385,459	—9,029,000
Atlantic Coast Line.....	60,335,126	6,613,154	10.96	5,811,154	—802,000	326,180,767	78,090,354	11.44	58,411,354	—20,679,000
Southern.....	102,624,674	11,371,189	11.08	9,836,189	—1,535,000	526,150,767	78,090,354	11.44	58,411,354	—20,679,000
Delaware & Hudson.....	36,727,926	4,080,964	11.20	3,641,964	—439,000	192,627,075	22,057,578	13.70	30,455,578	—7,388,000
Lehigh Valley.....	60,967,968	6,880,421	11.20	5,441,421	—1,439,000	312,989,245	34,916,699	10.44	34,916,699	—
Buffalo & Susquehanna.....	1,941,348	155,804	11.32	1,386,804	—554,000	11,580,456	1,163,741	9.84	1,135,741	—245,000
Chicago, Rock Island & Pacific.....	101,206,546	11,552,981	11.32	9,695,981	—1,857,000	532,686,472	60,593,198	10.95	53,002,198	—7,594,000
Chicago, Indianapolis & Louisville.....	120,536,645	13,947,781	11.57	11,924,781	—2,023,000	650,498,676	8,053,208	12.38	6,236,208	—1,817,000
New York, Chicago & St. Louis.....	40,276,937	4,673,328	11.60	4,158,328	—515,000	205,530,638	67,427,661	10.24	19,687,661	—47,740,000
Pennsylvania.....	517,450,673	60,263,446	11.64	53,529,446	—6,734,000	2,602,805,953	376,136,388	14.12	253,107,388	—121,029,000
Pere Marquette.....	30,962,930	3,682,252	11.90	2,946,252	—686,000	160,924,269	18,603,046	11.56	13,503,046	—5,100,000
Baltimore & Ohio.....	172,752,632	20,613,862	12.11	18,549,862	—2,064,000	931,031,532	113,970,483	12.25	89,040,483	—24,930,000
Maine Central.....	16,528,532	2,001,528	12.11	1,833,528	—168,000	83,057,532	11,156,253	11.95	9,912,253	—1,244,000
Erie.....	95,784,775	11,658,371	12.11	9,737,371	—1,921,000	482,027,643	59,323,603	10.96	52,627,603	—6,700,000
Missouri Pacific.....	98,466,366	12,007,235	12.19	10,433,235	—1,574,000	527,075,643	61,202,494	12.58	46,559,494	—14,647,000
Central R. R. of New Jersey.....	39,632,667	4,863,974	12.27	3,988,974	—875,000	202,075,872	31,785,968	13.70	22,232,968	—9,553,000
Buffalo, Rochester & Pittsburgh.....	14,351,122	1,653,156	12.29	1,390,156	—263,000	69,957,875	9,636,374	11.98	8,136,374	—1,500,000
Lehigh & New England.....	41,138,723	5,287,723	12.76	4,769,723	—518,000	207,707,892	24,227,706	12.16	21,914,706	—1,293,000
Reading.....	70,306,556	9,033,028	12.95	6,236,028	—2,797,000	327,706,000	46,575,000	12.75	35,226,000	—11,350,000
Minneapolis, St. Paul & Sault St. Marie.....	36,813,855	4,890,363	13.28	3,537,363	—1,353,000	171,602,565	28,376,408	12.35	18,828,468	—9,548,000
Great Northern.....	75,212,058	9,799,070	13.29	7,205,070	—2,594,000	382,629,215	52,629,215	13.91	39,949,215	—12,680,000
Roston & Maine.....	63,912,556	8,583,926	13.45	6,122,926	—2,461,000	324,815,673	38,726,228	12.75	36,674,228	—2,052,000
Union Pacific.....	131,611,098	19,048,221	13.45	13,522,221	—5,526,000	702,815,673	122,063,341	17.32	67,453,341	—135,360,000
New York Central.....	29,970,163	3,792,458	13.50	2,822,458	—970,000	150,613,398	20,216,822	13.45	14,552,822	—5,664,000
Kansas City Southern.....	25,256,528	2,061,806	13.51	1,651,806	—1,400,000	131,000,000	11,384,170	14.08	17,466,170	—6,082,000
Pittsburgh & Lake Erie.....	25,590,147	3,563,838	13.81	2,451,838	—1,112,000	131,000,000	11,384,170	14.08	17,466,170	—6,082,000
Chicago, Burlington & Quincy.....	119,958,734	17,183,629	14.33	14,922,629	—2,261,000	581,011,128	22,609,333	16.95	13,009,333	—19,592,000
New York, New Haven & Hartford.....	97,480,321	14,512,220	14.89	6,336,220	—8,176,000	538,560,923	78,486,330	14.62	64,527,330	—13,959,000
Southern Pacific Co.....	203,051,329	30,492,820	15.02	19,452,820	—11,040,000	1,032,641,495	172,470,695	16.85	96,064,695	—74,406,000
Missouri, Kansas-Texas.....	39,732,035	6,353,075	15.99	3,805,075	—2,548,000	203,073,400	37,634,000	18.35	19,646,000	—18,000,000
Carolina, Clinchfield & Ohio.....	5,904,984	951,705	16.12	1,427,136	—1,476,000	28,883,603	4,586,162	15.81	2,767,162	—1,819,000
New York, Ontario & Western.....	11,013,305	1,797,136	16.32	1,427,136	—1,370,000	59,208,604	8,983,024	15.25	5,643,024	—3,340,000
Rutland.....	5,476,007	253,068	16.58	149,068	—404,000	27,588,717	4,371,844	15.86	2,641,844	—1,730,000
Pittsburgh, Shawmut & Northern.....	1,556,332	253,068	16.58	149,068	—404,000	27,588,717	4,371,844	15.86	2,641,844	—1,730,000
Utah & Delaware.....	1,231,687	210,692	17.11	118,692	—112,000	5,283,141	1,178,517	15.36	793,885	—449,000
Northern Pacific.....	70,533,064	12,196,206	17.29	6,757,206	—5,439,000	402,167,326	70,203,796	17.45	38,327,796	—31,876,000
Achison, Topeka & Santa Fe.....	170,314,807	29,781,665	17.49	16,316,665	—13,465,000	901,590,483	172,493,362	19.13	86,372,362	—86,121,000
St. Louis Southwestern.....	20,027,914	2,978,841	17.96	1,918,841	—1,060,000	107,023,161	21,344,516	19.94	10,252,516	—11,092,000
Western Maryland.....	14,165,409	2,605,680	18.39	1,557,680	—1,048,000	80,844,423	13,812,034	17.08	7,742,034	—6,070,000
Canadian Pacific.....	145,274,914	26,763,665	18.42	13,917,665	—12,846,000	796,314,758	151,682,785	19.05	76,286,785	—75,396,000
Richmond, Fredericksburg & Potomac.....	7,895,344	1,465,971	18.57	756,971	—713,000	39,350,324	7,160,979	18.20	3,769,979	—3,391,000
Norfolk & Western.....	69,875,108	13,235,509	18.94	6,694,509	—6,541,000	359,817,476	66,153,961	18.39	34,470,961	—31,683,000
Banor & Ancon.....	5,090,039	1,020,490	20.01	20,917,445	29,517,445	37,582,019	5,705,507	20.69	2,642,507	—3,063,000
Canadian National.....	218,343,931	50,450,145	23.11	20,917,445	—29,517,445	1,137,035,140	262,759,235	23.11	108,928,235	—153,831,000
Detroit & Mackinac.....	1,601,595	170,841	29.96	153,841	—447,754	9,065,694	2,679,070	29.55	869,070	—1,810,000
Virginian.....	12,209,447	3,743,184	30.66	1,171,184	—2,572,000	63,574,970	15,665,149	24.64	6,091,149	—9,574,000
Totals.....	\$4,288,612,904	\$569,900,697	13.29	\$411,983,697	\$157,917,000	\$22,514,415,120	\$3,207,364,840	14.25	\$2,162,604,840	\$1,044,760,000

* Partially estimated account missing data.

Large Savings in Avoiding Surplus Material

*Published figures show \$158,000,000 excess on 68 roads—
Uniform accounting needed*

By William W. Tirrell

DURING the past few years a great deal has been written and published relating to the material carried in stock on railroads. Stress has been laid on the proposition that it costs money to tie up money in material, through the resulting interest, insurance, taxes, stores expense, re-handling, general administration, and obsolescence. With respect to the latter it is commonly realized that not all obsolescence is apparent and that much material that has traveled well on the road to obsolescence is applied because it is in stock, whereas newer and more up-to-date material would give better service. It is becoming increasingly evident that the losses to railroads are large where stocks exceed requirements, and committees have been active to reduce balances.

A difficulty, however, has been in determining the excess, if any. Responsible authorities have concluded that the amount of material sufficient to a four months' supply on a railroad should not be more than 10 per cent of the annual operating expenses, while carrying charges on material have been estimated by reliable agencies at 25 per cent of the purchasing price. On this basis the writer finds that 68 railroads had a total of \$158,000,000 excess material on hand on December 31, 1924, representing an annual carrying charge of \$39,000,000. The properties involved in this analysis comprise the railroads in the Eastern and Central districts, and some of the principal lines radiating from these districts. They are all found in the accompanying chart where the roads are listed according to the magnitude of their ratios of material to operating expenses.

Two groups of information are developed for each property. In the first group are shown each road's operating expenses for 1924, the stock on hand as of December 31, 1924, and the ratio of this stock to the operating expenses. In this group are also shown the normal supply, the excess supply and the carrying charges on this excess supply. The second group is similar to the first but considers the annual operating expenses and the stock balances as of the close of each year for a five-year period. In both groups the operating expenses and value of stock on hand have been taken from the published reports of the railroads. The ratios of stock to operating expenses in the third column of each group are therefore statistically correct. The normal supply figures shown in column four of each group are based on the I. C. C. formula for determining working capital (discussed in the *Railway Age* of April 18, 1925, page 977), according to which working capital is placed at "9.58 per cent of the average annual operating expenses during the period considered." The figures in this column represent what the stock should have been to equal this percentage of the operating expenses. The carrying charges, shown in the last column of the first group, are based on charts of the U. S. Department of Commerce, as applied to the carrying charges of material in industrial and business fields. The table shows that when the figures for the five years, ending

December 31, 1924, are used, the total excess of stock for the railroads on the basis of the I. C. C. formula is \$209,000,000 per year.

Whether or not the \$158,000,000 excess supply and the \$39,000,000 annual carrying charges are exaggerated figures, it cannot be seriously questioned that there is a large excess of material held in stock by railroads. In view of this, the comparisons of the data and statistics in this chart and the carrying charges on the excess material as determined, may prove useful in exciting discussion and in drawing attention to the real needs of the problem of eliminating excessive stock, and also in improving stores efficiency. Unfortunately, there is now no unit of measure to gage the relative efficiency between stores departments accurately, and a true picture of comparative conditions among railroads is impracticable, under present conditions. This is because of the fact that in their accounting different carriers place different interpretations upon the classification provisions for the material account. With some carriers all the material passes through the stores department and is distributed to maintenance and constructive work on written orders, with charges to operation or construction accounts as and when issued or applied, whereas, other carriers charge the material direct to the work when shipped. The I. C. C. classification account No. 716—Material and Supplies—includes such fluctuating items as fuel supply, seasonal rail purchases, ties for treating, etc., purchased according to the policy of management. One of the real needs facing railroads therefore, in determining excess stock and improving their stores situation is to eliminate the diversity in accounting methods, so that more accurate comparisons can be made between railroads.

It is obvious that work in this direction will produce results profitable to the property. But it can also be seen that a further need for true units of comparisons, may be found in the operating efficiency suggestions of the Transportation Act. Prosperous roads are not necessarily the most efficiently operated properties in the language of the Act, and while the government does not interfere in the problems of management, it has delegated its regulatory and police powers so as to reward operating efficiency and penalize operating inefficiency. Better units of comparison between railroads are important instruments in such investigations.

FORTY-FIVE PER CENT REDUCTION in the number of casualties to employees since 1920 is the result claimed for the safety-first activities in the plants of American cement manufacturers, according to a memorandum issued by the National Safety Council; and 33 per cent reduction in the number of fatalities. The safety activities of this industry are carried on by the Portland Cement Association, William M. Kinney, general manager. The association co-ordinates the work of the different manufacturing plants, the total number of workmen being about 40,000.

Illinois Central Prosperity Continues

Net income in 1925 equivalent to \$12.86 ¹/₂ share on common stock—Interesting history

THE Illinois Central annual report for 1925, made public this week, shows net income after interest and other charges of \$17,551,743, equivalent after allowance for preferred dividends to \$12.86 a share on the common stock and comparing with net income in 1924 of \$16,248,558 or \$12.39 a share on the common stock. Although the 1925 net income represents the best year in a series of progressively improving years since 1917, the 1925 net did not succeed in equalling the remarkable

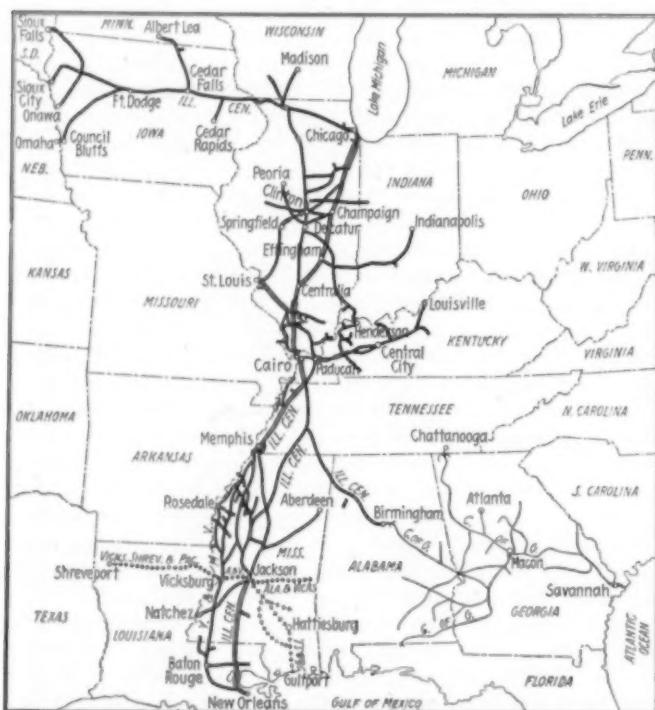
a rail link in the Panama Canal route between the industrial areas in the central west and the Pacific Coast. The point is that the Illinois Central's administrative efficiency put it in a position to realize fully from these advantages so that the combined influences have enabled the railroad to become one of America's leading and most prosperous systems.

Size of the System

The Illinois Central today operates a total of about 5,000 miles of railroad. In addition it controls the Yazoo & Mississippi Valley, the traffic and earnings figure of which are now reported with those of the parent company and the mileage of which brings the total to about 6,250 miles. Since 1909 also the Illinois Central has controlled the Central of Georgia which yields the parent company about one million dollars in dividends annually, which operates about 1,800 miles of line and in addition owns a majority control in the Wrightsville & Tennille, all of the stock of the Wadley Southern, all of the stock of the Ocean Steamship Company which operates a line of boats between Savannah and New York and Boston and also an interest in the Atlanta & West Point and other lines in Georgia. In 1925, furthermore, the Illinois Central was authorized by the Interstate Commerce Commission to acquire the Gulf & Ship Island and there is now pending before the Interstate Commerce Commission, application for authority to acquire the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific.

History

The history of the Illinois Central dates back to 1851 when the company was chartered in Illinois to build two lines in Illinois, one from Chicago to Cairo and the other from East Dubuque to a connection with the first-named line at Centralia. In connection with this charter, the road was given a land grant of 2,500,000 acres of public lands which had been given the state of Illinois by the national government in accordance with an act of Congress, passed in September, 1850. Much comment has been made about the benefits accruing to the Illinois Central from this grant but President Markham seems to have been able to prove conclusively that the burdens resulting from the conditions under which the land grant was made have considerably more than compensated for the benefits. However, the construction of the new company's lines was begun in 1850 and completed in 1856. At that time the population of Chicago was but 30,000 and the people of that enterprising city put upon the new company the necessity of placing its entrance into Chicago along the water front of Lake Michigan, this being accepted by the citizens as an apt solution of the problem of holding the shores of the Lake, the disintegration of which in storms had compelled the city to spend large sums of money. In 1852, New Orleans capitalists organized a company to build a line northward from their city to a connection with the Illinois Central at Cairo. By 1861 the new road had reached Jackson, Tenn., whereupon construction was suspended until after the Civil War so that Cairo was not reached until 1873. For a time a car transfer service was maintained across the Ohio River but in 1882 the Illinois Central acquired the lines south of the river by lease and in 1889 the two lines were definitely joined by a bridge.



The Illinois Central

earnings which this road reported in 1916 when net income after charges totaled \$17,627,202.

Favored by Circumstances

The Illinois Central is a remarkable property that seems to have been favored in an unusual degree by circumstances. First, it is strategically located in the Mississippi Valley and has the short line between Chicago and the Port of New Orleans, serving, therefore, one of the richest sections of the North American continent. The property has been under its present management since President C. H. Markham was made its executive in 1911. The early years of Mr. Markham's administration were characterized by gradual improvement in the efficiency of the property's management, results becoming apparent just about that time when there began to be an increasing practical realization of the commercial and industrial possibilities of the South. Besides benefiting from this, the property was also benefited by the opening of the Panama Canal which, from the standpoint of its direct influences, has probably hurt the railways of this country more than it has helped them but which, on the contrary, has helped the Illinois Central very directly, because that road forms

The Illinois Central maintained itself exclusively as an Illinois property until 1867 when it acquired the Dubuque & Sioux City by lease and in 1870 completed a line across Iowa to the Missouri River. The Yazoo & Mississippi Valley, the Illinois Central subsidiary that serves that portion of the Mississippi Valley lying between the Illinois Central main line and the river dates back to 1882 and was acquired by the Illinois Central about ten years later. The line between Memphis and Louisville was acquired in 1897. The road reached Birmingham in 1908, Indianapolis in 1911, and connection with the growing Southeast was obtained by the acquisition of the Central of Georgia in 1909.

Diversified Traffic

The Illinois Central, as would be expected from the wide extent of territory that it serves and the varying climate resulting from extension through almost the entire width of the United States, has a widely diversified traffic. In 1925, the revenue tonnage was divided about as follows: Products of agriculture, 13 per cent; animals and products, 2 per cent; products of mines, 48 per cent; products of forest, 14 per cent; manufactures and miscellaneous, 18.54 per cent and l.c.l. freight, 8.45 per cent. The products of agriculture include, notably, corn and wheat received from the lines extending west into Iowa. The railway is especially noted for its fast freight service supplied for the banana traffic received at the port of New Orleans and in addition there is a growing traffic in strawberries and similar commodities grown along the southern parts of the line. It has a share also of the California perishable freight moving through Omaha. The lumber traffic originates principally in Mississippi and the Illinois Central brings to the Chicago market approximately one-sixth of all the lumber brought to that market and more than is delivered by any other carrier.

In 1925, of the total revenue tonnage, 32.47 per cent was bituminous coal which the Illinois Central received

or, at least that other traffic is growing in more rapid degree than the coal traffic.

Capital Improvements

The fact that the Illinois Central was the first road to be built into most of the cities which it serves means that today the Illinois Central is favored by having excellent terminals in these communities. Any one who studies the Illinois Central affairs, however, will also notice the great

ILLINOIS CENTRAL (INCLUDING YAZOO & MISSISSIPPI VALLEY)
Table II—Comparison of Selected Freight Operating Statistics

	1925	1920	Per cent of change	
			Inc.	Dec.
Mileage operated.....	6,225	6,152	1.3	...
Gross ton-miles (thousands).....	38,675,581	36,849,449	4.9	...
Net ton-miles (thousands).....	16,710,873	17,488,997	...	4.4
Freight train-miles (thousands).....	22,026	23,548	...	6.4
Freight locomotive-miles (thousands).....	22,688	24,147	...	6.0
Freight car-miles (thousands).....	972,890	887,997	9.6	...
Freight train-hours.....	1,775,124	2,167,061	...	18.1
Tons of coal consumed by freight locos.	2,872,021	3,061,429	...	6.1
Car-miles per day.....	39.1	40.9	...	4.4
Net tons per loaded car.....	26.9	29.7	...	9.4
Per cent loaded to total car-miles...	63.9	66.2	...	2.3
Net ton-miles per car day.....	673	805	...	16.4
Freight cars per train.....	45.2	38.7	16.8	...
Gross tons per train.....	1,756	1,565	12.2	...
Net tons per train.....	759	743	2.1	...
Train speed, miles per train-hour....	12.4	10.9	13.7	...
Gross ton-miles per train-hour.....	21,788	17,004	28.1	...
Net ton-miles per train-hour.....	9,414	8,070	16.6	...
Lb. coal per 1,000 gross ton-miles..	133	...	...	...
Loco-miles per loco-day.....	71.4	80.5	...	11.3
Per cent freight locos. unserviceable..	12.3	13.1	...	0.8
Per cent freight cars unserviceable..	4.9	5.3	...	0.4

amount of attention that the management has given to continuing or improving its favorable position from the standpoint of enabling it to serve its public. For the past two or three years the road has been engaged in some particularly important capital improvements. One has been the construction of Markham Yard near Homewood, Ill., which is now nearly completed. The road is at present engaged also in the construction of an entirely new

TABLE I—ILLINOIS CENTRAL, COMPARISON OF OPERATING RESULTS, SELECTED ITEMS, 1916 TO 1925

Year	Mileage	Revenue ton miles	Revenue passenger miles	Revenue per ton mile, cents	Total operating revenues	Total operating expenses	Net operating revenues	Operating ratio	Net railway operating income	Net after charges	Net charges for additions and betterments
1916....	4,767	9,156,871,000	729,454,000	0.540	73,740,266	52,843,149	20,897,117	71.66	17,627,202	17,627,202	4,417,472
1917....	4,766	11,230,070,000	839,877,000	0.520	87,144,787	62,339,834	24,804,952	71.54	15,191,326	15,191,326	15,642,691
1918....	4,778	12,441,048,000	867,384,000	0.637	107,320,261	90,252,033	17,068,226	84.10	12,981,324	10,956,702	27,197,480
1919....	4,793	9,994,435,000	946,076,000	0.759	107,886,835	99,262,712	8,624,123	92.01	44,479,526	12,168,919	9,444,414
1920....	4,799	13,724,283,000	982,729,000	0.774	145,154,272	134,181,514	10,972,758	92.44	511,296	13,571,122	17,295,943
1921....	4,799	11,084,094,000	810,064,000	0.966	141,127,066	116,852,333	24,274,733	82.80	17,542,228	9,700,794	21,120,038
1922....	4,784	14,151,817,000	815,614,000	0.847	154,860,387	119,129,269	35,731,118	76.93	25,121,128	16,089,676	17,342,565
1923....	4,840	15,069,986,000	894,509,000	0.843	165,626,982	132,429,231	33,197,751	79.96	22,906,244	15,485,074	50,729,721

ILLINOIS CENTRAL, INCLUDING YAZOO & MISSISSIPPI VALLEY, 1923 TO 1925

Year	Mileage	Revenue ton miles	Revenue passenger miles	Revenue per ton mile, cents	Total operating revenues	Total operating expenses	Net operating revenues	Operating ratio	Net railway operating income	Net after charges	Net charges for additions and betterments
1923....	6,209	16,151,798,440	1,019,621,000	0.884	186,763,167	150,023,277	36,739,890	80.33	24,863,440	15,485,074	...
1924....	6,218	14,284,712,470	970,793,000	0.925	173,838,132	134,024,921	39,813,211	77.10	28,102,073	16,248,558	28,970,441
1925....	6,243	14,891,944,844	966,350,000	0.921	178,169,625	135,382,527	42,787,099	75.99	29,926,943	17,551,743	39,300,379

from mines in southern Illinois, Indiana and Kentucky. This traffic seems to have suffered to some extent because the greater part of the tonnage is received from union mines which are now at a disadvantage in competition with the non-union mines in the area served by the Louisville & Nashville and the roads in the Pocahontas region. In recent years there has been a progressive decrease in the proportion of coal traffic to total revenue tonnage. Thus in 1916 bituminous coal constituted 39 per cent of the total tonnage, in 1920, 45 per cent, in 1923, 37 per cent but in 1924 only 32 per cent. The coal traffic in 1925 was 15 per cent less than that handled in 1923. The figures would seem to indicate that coal has gradually become proportionately a less important factor in the Illinois Central service than was formerly the case

line of railroad to Edgewood, Ill., to Fulton, Ky., 163 miles, which is one of the largest capital improvements at present in process on any railroad and which will cost eventually in the neighborhood of \$17,000,000. The purpose of the line is to relieve congestion at Cairo and on the lines serving the Cairo Bridge. The new line will have a maximum grade of about 0.3 per cent. During 1925, 69 per cent of the grading north of the Ohio River was completed and about 81 per cent of the grading south of the river. Third, there is the extensive Chicago terminal improvement work which may ultimately involve the expenditure of over \$100,000,000 but which more expeditiously calls for the expenditure of \$17,000,000, in 1926 alone, in connection with the electrification of the suburban service. Not the least of the advantages which the

Illinois Central will gain from the Chicago terminal improvements is expected to be valuable air rights in one of the choicest sections of the most important city which it serves. It is of interest that the road's net charges for additions and betterments in 1923 totaled over \$50,000,000, that in 1924 this was supplemented by an additional \$29,000,000 and in 1925 by \$39,000,000 and that the budget of 1926 totals an additional \$41,000,000.

Financing with Stock

Of course, no one speaks of the Illinois Central without referring to the fact that it has been one of the very small list of roads in this country that has succeeded in recent years in financing its capital needs by the issue of stock. The road last sold common stock in 1908 when the company offered to its stockholders \$14,256,000, to be used to reduce the company's floating debt. In April, 1922, however, the stockholders authorized the issuance of \$50,000,000 7 per cent non-cumulative preferred stock. In June, 1922, \$10,929,600 of this issue was sold, in October, 1923, an additional \$10,952,180 and in October, 1925, an additional \$13,000,000. This stock is convertible into common stock at par and is redeemable at 115 after September 1, 1927. Some of the issue has already been converted and the total amount outstanding on December 1, 1925 was \$29,194,400. The company's common stock totals \$124,921,600, making the total stock outstanding \$154,191,152 as compared with a long-term debt totaling \$327,087,358.

1925 Results

The Illinois Central in 1925 as compared with 1924, had an increase in its operating revenues of \$4,331,493 or 2.49 per cent, its freight revenues showed an increase of 3.78 per cent, its passenger revenues a decrease of 3.16 per cent. The revenue ton miles were 4.25 per cent greater than in 1924 but not as great as in 1923, 1922 or 1920. The operating expenses showed an increase of \$1,357,606 or 1.01 per cent. It is of interest that maintenance of way expenses increased \$2,434,888 or 10.18 per cent but that maintenance of equipment expenses decreased 1.78 per cent and transportation expenses 1.46 per cent. That the last-named showed a decrease even with the increase in traffic is credited to the fact that there was a decrease in the cost and consumption of fuel. The 1925 operating ratio was 75.99 as compared with 77.10 in 1924 and the lowest operating ratio reported since 1917. The 1925 ratio of transportation expenses to total operating revenues was 35.07 as compared with 36.47 in 1924. In 1925 the road reported a net railway operating income or net after equipment and joint facility rents of \$29,926,943. This compared with \$28,102,073 in 1924 and was much the best net operating income reported since the beginning of Federal control.

Operating Statistics

There is shown in this article the usual comparison of selected freight operating statistics. These statistics suffer to some extent because of the fact that the 1925 traffic was less than that in 1920 with the figures for which the 1925 statistics are compared. The table shows that the decrease in net ton miles was 4.4 per cent, that the freight train miles decreased 6.4 per cent but the freight train hours decreased 18.1 per cent. On the other hand, it is extremely interesting to observe that in 1925 as compared with 1920 the road effected an increase in its train speed from 10.9 to 12.4 with the result that the gross ton miles per train hour increased 28.1 per cent and net ton miles per train hour 16.6 per cent. One notes with interest that the Illinois Central reports a figure of car miles per day of 39.1 and that on the average in 1925 the percentage of freight locomotives unserviceable was main-

tained at the remarkably low figure of 12.3 and the percentage of bad-order cars at 4.9.

The conclusion would seem to be that the Illinois Central is maintaining its admitted operating efficiency, that it is benefiting from the growing prosperity of the South but that the effects of the latter are counterbalanced to some extent by the adverse effects on the union coal mine operation of the Jacksonville wage agreement and possibly also by some of the lack of prosperity that seems still to be ruling in the Northwest.

Great Northern Converts Sleeping Cars to Day Coaches

WHEN the Pullman Company took over the Great Northern sleeping car service, the railroad was left with a supply of sleeping cars of all-steel construction, for which it had no immediate use. These cars have been converted into day coaches, the interior of one of which is shown in the illustration. No changes were made to the body structure, interior arrangement of the compartments or lighting fixtures. The alterations



Interior View of the New Day Coaches Converted from Sleeping Cars by the Great Northern for Service on Its Oriental Limited

consisted essentially of removing the berths and installing seats and luggage racks. The interior of the cars is tinted in pastel shades of green.

The men's toilet and smoking room is now used as a smoking and club room for the use of the male coach passengers, while the ladies' toilet and dressing room has been retained for the accommodation of the lady passengers. These cars are now being used on the new Oriental Limited of the Great Northern.

THE GULF, MOBILE & NORTHERN in March established new fuel records, as a result of a campaign. The month's performance figures show 118 lb. of coal consumed per 1,000 gross ton-miles. The winners who established the record will be sent by the company to Washington, and also to Philadelphia, and they will visit the Eddystone plant of the Baldwin Locomotive Works. Three engine crews will make the trip, being the winners in passenger, through freight and local freight service.

The New York Central's Centenary

*Meetings to commemorate the granting of the charter of the
Mohawk & Hudson Railroad April 17, 1826*

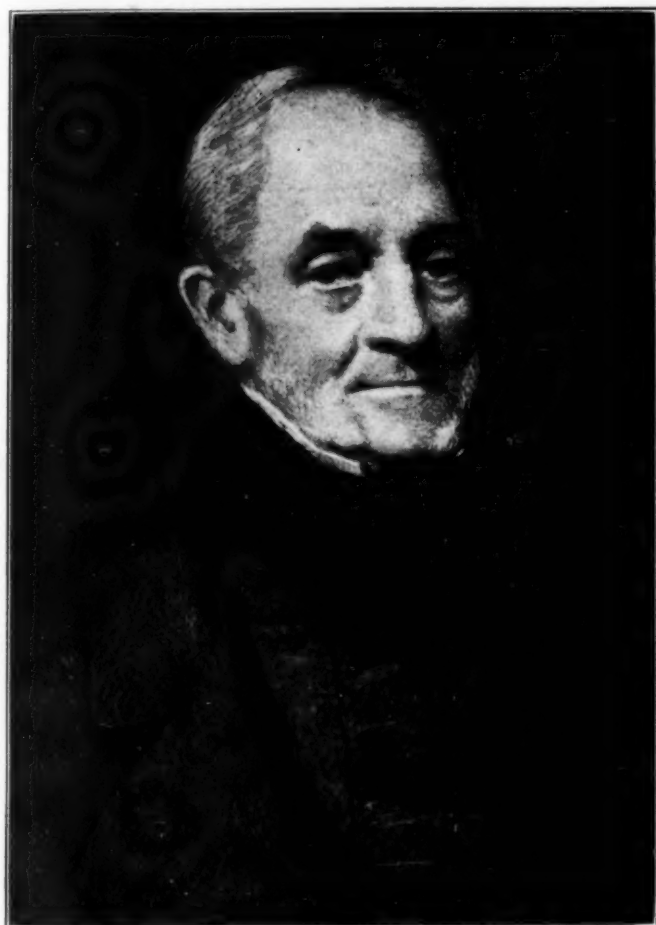
THE celebration of the 100th anniversary of the granting of the first charter of a part of the New York Central Railroad, briefly announced in the *Railway Age* of April 10, page 1032, was carried out according to program on Saturday, April 17. The special train carrying officers of the company started from New York City at 7 a. m. for Albany where brief ex-

panels at top and bottom, respectively, pictures of the "De Witt Clinton" locomotive and train and the Twentieth Century Limited. The wording is as below:

APRIL 17, 1826—APRIL 17, 1926

TO COMMEMORATE THE ONE HUNDREDTH ANNIVERSARY OF THE CHARTERING OF THE MOHAWK AND HUDSON RAILROAD COMPANY, WHICH BUILT AND OPERATED BETWEEN ALBANY AND SCHENECTADY THE FIRST RAILROAD IN THE STATE OF NEW YORK, THIS TABLET IS ERECTED BY THE SUCCESSOR OF THAT COMPANY, THE NEW YORK CENTRAL RAILROAD COMPANY

A part of the entertainment at Albany was a reproduction, with men and women passengers dressed in the



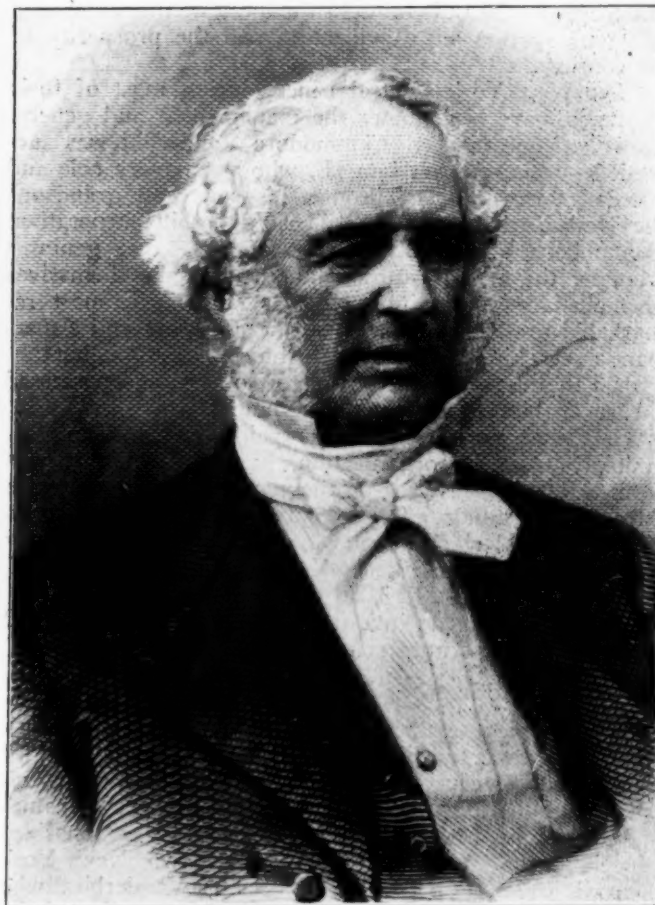
George W. Featherstonhaugh

Pioneer advocate of steam railroads; leader in starting the Mohawk & Hudson

ercises were conducted in the passenger station, including the unveiling of a bronze memorial.

From Albany, the train proceeded to Schenectady, preceded by the pageant of locomotives which included among others the De Witt Clinton, the famous 999 which made the record run on the Empire State Express, a passenger Atlantic, a passenger Pacific and the most modern freight locomotives. At Schenectady with appropriate exercises a similar tablet was also unveiled and the company then proceeded over the Castleton cut-off to the A. H. Smith memorial bridge across the Hudson. The historic locomotive, the De Witt Clinton, drawing its stage-coach cars, was run over the memorial bridge under its own steam.

Both of the commemorative tablets show in bas relief



Commodore Cornelius Vanderbilt

Builder of the New York Central System

costumes of 1831, of the doings at the starting of the first train, on August 9, 1831.

Returning to New York City, the guests of the New York Central were entertained at dinner in the evening at the Waldorf-Astoria, the six hundred or more guests including prominent government and public service of-

ficials, railroad presidents and other prominent citizens. Patrick E. Crowley, president, was toastmaster, and the principal speaker was Chauncey M. Depew, chairman of the company, now 92 years old.

Mr. Depew said in part:

"It is a very interesting and suggestive thought that of the 100 years since the beginning of the New York Central Railroad I have lived all but eight of them. I can claim to have been a participant in its affairs during most of that period, and for over 60 years a member of its staff, for thirteen its President, and for 27 chairman of the board.

"The growth and expansion of the company owes much to the wonderful territory of the lines, the great increase in population, in economic development, the industrial expansion along its route, and the empire building of the whole country.

"We trace the New York Central from its first expansion from Albany to Schenectady, and then by natural growth extending its lines to Buffalo, and from Buffalo to Chicago and the West, then to Cincinnati and St. Louis in the Southwest, then to the Northwest into Canada.

"In the early days it was said that every mile of new railway brought into cultivation and production 100,000 acres of farming land, and it was a wonderful picture to see these new communities and happy homes rising like magic as the rails brought them out of the wilderness into participation with civilization and the prosperity of the country.

"The New York Central Lines, during most of their existence, have been under the management and general control of one family. Commodore Vanderbilt was succeeded by his son, William H., who was a very able and successful executive. Through his sons and grandsons the New York Central is still a Vanderbilt corporation. Commodore Vanderbilt was one of those rare geniuses who, by their own natural equipment, make themselves phenomenally successful. He was one of the most remarkable products of American organization and American citizenship. He said little in conversation, but absorbed the ideas and suggestions of others, and possessed a rare analytical power of discernment."

The New York Central has paid dividends uninterruptedly from its organization, in 1853, when it was formed as the successor of the ten short roads between Albany and Buffalo. It is one of the few large railroads of the country which has never gone through bankruptcy and never missed a dividend. The New York Central system today operates 12,000 miles of main line, its properties representing an investment of about \$2,000,000,000 and its employees numbering upward of 160,000.

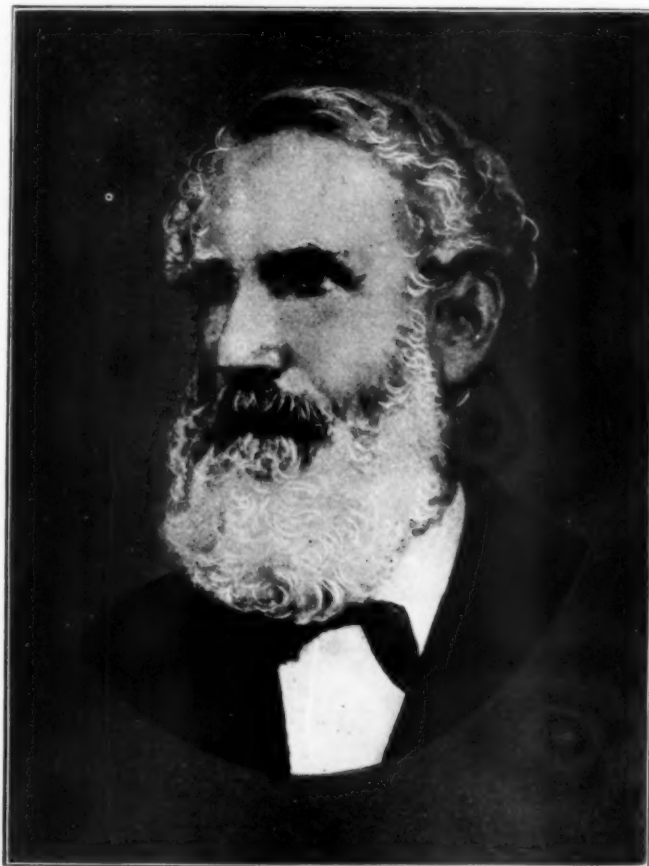
Address of President Crowley

Mr. Crowley reviewed the history of the New York Central system, touching also upon the general history of railroad enterprise in America and its glorious results. Of the long list of empire builders whose names were brought to mind by his review, he emphasized especially the genius and abilities of two New York Central leaders, Commodore Cornelius Vanderbilt, who organized the road in 1869 by the amalgamation of the New York & Harlem, the Hudson River and the New York Central, and Alfred H. Smith, Mr. Crowley's immediate predecessor, who was president from 1914 to 1924. Mr. Smith, said the speaker, was president during one of the most trying periods for all our railroads in their entire history, because of the numerous problems of finance and legislation and need for expansion; "but in spite of almost indescribable difficulties and handicaps, under his guidance the New York Central made

tremendous advances in the upbuilding of its plant, the perfecting of its personnel and the attainment of economy and efficiency. All New York Central men gain inspiration from contemplation of the spirit and accomplishments of A. H. Smith, and the efforts of his life and the plans which he laid will be a real power in the workings of our organization for many years to come."

In closing his address and looking more to the present and future, Mr. Crowley said:

"If a railroad is efficiently to serve a country like ours, it must not only keep young but grow stronger year after year. A railroad that is not growing is dying. Obsolescence will strangle it. To carry the great traffic of today with the equipment and facilities of only ten years ago would be impossible. And it would be just



Dave Matthews

First engineman of the DeWitt Clinton

as impossible to carry the greater traffic of ten years hence with the present facilities and equipment.

"The railroads of the country, as a whole, have never been so well managed, so efficient, so responsive to the public needs as they are at the present time. It may be that some of our systems, great as they are now, will be greater. It may be that weaker roads will be strengthened by closer associations with stronger ones, and that stronger ones, through that association, will become even more efficient. But the greatest factor today in the success of our railroads and their hope for the future lies in co-operation—co-operation between the managements and their employees, between the carriers and the public bodies by whom they are regulated and, above all, co-operation between the railroads and the public they serve."

"Movies" and Souvenirs

At the dinner motion pictures were shown of movements of the special train, and of other scenes which had

been witnessed by the guests in the morning, and each individual received as souvenir a handsome 60-page booklet 8½ in. by 11¼ in., and a small model of the DeWitt Clinton train. The booklet contains a succinct history of the road with a profusion of beautiful historical pictures.

George W. Featherstonhaugh, the pioneer whose portrait is here reproduced is characterized as a distinguished scientist of Schenectady County, a personal friend of Washington, Jefferson, Madison and Lafayette, who in England became familiar with the early work of George Stephenson in building the Stockton & Darlington. Featherstonhaugh's tremendous energy and persistence were devoted to the idea of establishing a steam railroad and he agitated the subject for years. But the first president of the Mohawk & Hudson was Stephen Van Rensselaer, the last patroon, who had wealth and wide influence.

Associated Traffic Clubs of America Meet at Dallas

THE Associated Traffic Clubs of America opposed regional representation on the Interstate Commerce Commission, condemned political rate making and favored the settlement of labor disputes through direct negotiations between the carriers and their employees at the annual meeting on April 13 and 14 at the Adolphus hotel, Dallas, Tex. The attendance totalled 100, including 89 delegates and alternates from 40 member clubs and visitors. The association now includes 52 member clubs, the traffic clubs of South Bend, Ind., Columbus, Ohio, Ft. Wayne, Ind., and the Women's Traffic Club of San Francisco having been admitted and the traffic club of Lansing, Mich., having been reinstated.

A special committee of which F. L. Speiden was chairman, offered a recommendation on the settlement of labor disputes. The resolution was the same as that passed at the last meeting except that the committee recommended the withdrawal of that portion of the previous report which deals with the continuation of the United States Railroad Labor Board. The association is still in favor of the representation of the public on questions relating to railroad labor.

The resolution offered by the committee on procedure on the subject of political rate making was unanimously adopted. It was resolved that the officers of the organization be directed to express again to the members of Congress the opposition of the Associated Traffic Clubs of America to all phases of political rate making. It was felt that as political rate making is still a menace confronting the American people, the Associated Traffic Clubs of America deem it advisable and necessary in the interests of the public to reaffirm the stand in opposition to such action.

The association opposed the appointment of interstate commerce commissioners by districts or regions and its officers were instructed to notify members of Congress to this effect. It was felt that the duties and responsibilities of the Interstate Commerce Commission are such that sectional considerations should not govern its course of action. It should be as free from political influence as the Supreme Court of the United States.

The subject of arbitration between transportation companies and the public through a third party was considered in a report by a committee and the meeting went on record as not favoring any such plan. It was recommended that the Associated Traffic Clubs of America endorse the principle of arbitration as set forth in the various statutes

of the several states and that advocated by the Arbitration Foundation, Inc., and the Arbitration Society of America, but that the association express also the view that it is not at present impressed with the material importance of the subject insofar as the question of freight claims is concerned. The report of the committee outlined the success of arbitration as a whole, but felt there was only one subject of controversy in which the traffic interests of the country are involved and which could be the subject of arbitration. That was the question of claims for loss or damage to freight. With the claim situation as it now stands, it was felt that arbitration would not be warranted under the circumstances.

"Shipper and carrier co-operation in transportation," was adopted as the slogan of the association after considerable discussion.

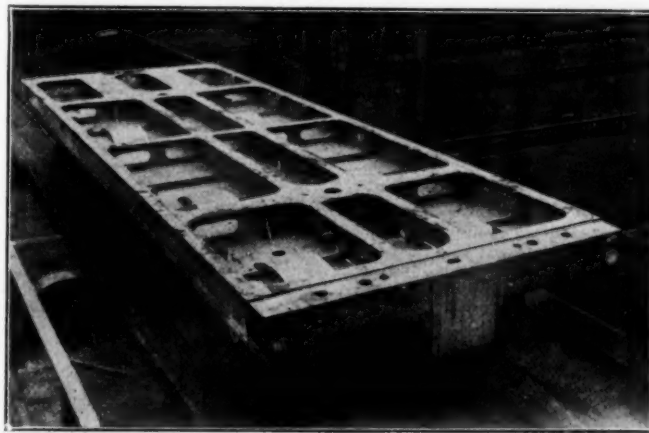
At the banquet on April 13 addresses were made by J. C. Harris, mayor pro tem of Dallas; J. N. Leopold, manager of the Southern division of the United States Chamber of Commerce, and R. H. Safford, executive vice-president of the Gulf Coast Lines.

Officers elected were, president, T. T. Webster, general traffic manager of C. H. Mead Company, Dayton, Ohio; first vice-president, W. C. Fitch, freight claim agent, Southern Pacific, San Francisco, Cal.; second vice-president, T. B. Curtis, Atlanta, Ga.; third vice-president, T. C. Burwell, Decatur, Ill.; and fourth vice-president, P. R. Flanagan, St. Paul, Minn. F. A. Doebber was re-elected secretary and W. T. Vanderburgh was re-elected treasurer.

Milwaukee, Wis., was chosen as the place of the next meeting.

Locomotive Tender Contains Novel Features

THE Terminal Railroad Association of St. Louis is the connecting link between East St. Louis and St. Louis. One of its switching lines runs over the Eads Bridge, passes through a tunnel about a mile long and terminates at the Crompton avenue yard in St.

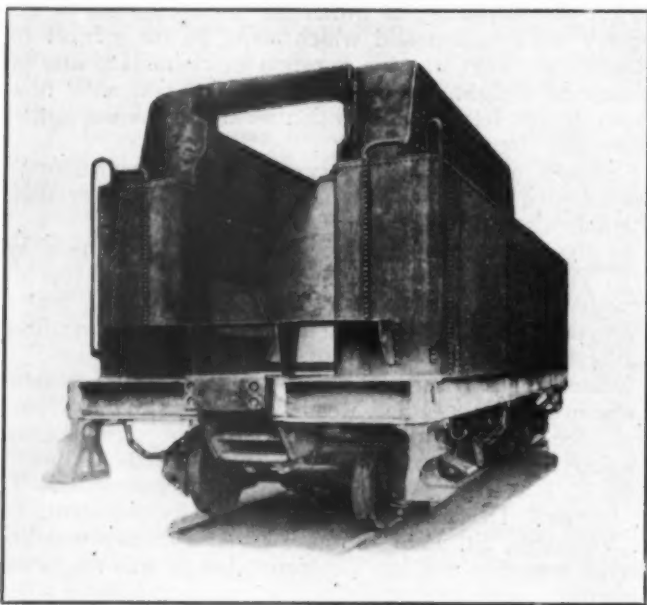


The Tender Frame Is So Cast as to Provide 12 in. Additional Water Space

Louis. In order that the smoke will pass back over the locomotive tender and not come into the cab, the height of the tender has been kept considerably below the top of the cab. To increase the water capacity of the tender the frame was so cast that it could be utilized as part of the water capacity of the cistern. These tenders were con-

structed in the shops of the Terminal Railroad Association of St. Louis.

The standard tender frame of the Commonwealth Steel Company has been cast with a solid bottom to which the side and end sheets of the water and coal space are welded. The frame forms the bottom of the tank, also



Locomotive Tender Built in the Shops of the Terminal Railroad Association of St. Louis

eliminating the necessity for a bottom on the cistern and for wood decking between the cistern and the frame which usually requires frequent attention and renewal. This type of construction increased the water space 12 in. in depth without increasing the height of the tender.

Interest Bill Reported

WASHINGTON, D. C.

SENATOR GOODING on April 15 submitted to the Senate a report from the committee on interstate commerce recommending the passage with the amendments adopted at the meeting on April 14 of his bill to provide for the refunding at a lower rate of interest of railroad indebtedness to the federal government, in part as follows:

The bill is a step to insure adequate transportation for the regions served by the railroads affected by the bill.

Briefly stated, the bill provides that railroads now owing the government on indebtedness incurred during federal control may, with the consent of the Secretary of the Treasury and the approval of the Interstate Commerce Commission, pay that indebtedness within 30 years through a reduction in the rate of interest to not less than $4\frac{1}{4}$ per cent and an application, to the discharge of the principal, of not less than the balance of the 6 per cent now paid to the government.

The procedure contemplates an investigation by the Interstate Commerce Commission of each carrier applying for an extension and reduction of interest, to the end that if the Interstate Commerce Commission shall find and certify to the Secretary of the Treasury that such extension and reduction should be granted to enable or aid such carrier to properly meet the transportation needs of the public, then the Secretary of the Treasury is authorized to make arrangements for the extension of the time and the reduction of the interest as above described, and not otherwise.

If it becomes necessary for a carrier to issue evidences of indebtedness to the United States in order to effect the extension of time and reduction of the indebtedness, authority is given, similar to that which was previously given under the transportation act, to issue such evidences of indebtedness (but only to the

United States) without the approval of any authority, state or federal.

The committee held several hearings and questioned bond and stockholding interests concerned in the passage of this act, railroad executives, reorganization managers representing railroads in receivers' hands, and undergoing reorganization. It is the opinion of this committee that the general trend of this testimony shows necessity of the government's granting relief of this character in order to sustain the financial credit of the carriers affected by this act; that it is also an act of justice in fulfillment of President Wilson's promise to the investors when their properties were taken under federal control.

In reporting this bill favorably the committee has in mind three results:

1. To aid or enable carriers affected to provide for the transportation needs of the public;
2. To insure that such benefits as come from the bill inure to the railroads' security holders; and
3. To restore and maintain the credit of such carriers as are unable to meet the early maturities of their obligations to the government.

The number of railroads owing the government on February 28, 1926, was 51. The amount which they owed was \$301,155,593.

The money which was loaned by the government to meet the necessities of these roads at the time they were turned back to their owners was either raised by taxation or by the sale of bonds. The money raised by the sale of bonds cost the government not to exceed $4\frac{1}{4}$ per cent.

For the fiscal years ending June 30, 1921, to June 30, 1925, four years, the government has received from the railroads, as interest at 6 per cent on their indebtedness, \$40,635,092 in excess of the cost of the money reckoned at $4\frac{1}{4}$ per cent.

The committee on interstate commerce of the Senate, having been advised that the Interstate Commerce Commission is now making investigation of the conditions that have existed on the Chicago, Milwaukee & St. Paul for some years past, requested the chairman of the Interstate Commerce Commission, Mr. Eastman, and Commissioner Cox, who has charge of the investigation of the Chicago, Milwaukee & St. Paul for the Interstate Commerce Commission, to appear before the committee and advise the committee of the nature of this investigation. Both Mr. Eastman, of the Interstate Commerce Commission, and Commissioner Cox assured the committee that its investigation of the Chicago, Milwaukee & St. Paul would be thorough and searching in every respect.

The committee has paid special attention to the effect of the passage of this bill upon that company. In view of the statement of Chairman Eastman of the Interstate Commerce Commission, "I do not anticipate that the commission will desire to pass upon any plan of reorganization until all the facts developed by this investigation are before it," it is impossible to forecast the exact form which the reorganization of the Chicago, Milwaukee & St. Paul will take.

However, the committee finds that the present so-called "modified plan of reorganization" calls for the raising of \$70,000,000 from the stockholders of this property by an assessment of \$28 on each share of preferred stock and \$32 on each share of common stock. This "modified plan" expressly affords the stockholders an opportunity to be relieved of \$55,000,000 of this assessment in case legislation of this character is passed. Under this plan it is agreed that if this legislation is enacted the cash to be raised from the stockholders will be reduced by substantially \$55,000,000.

The small stockholders of this property will, in the opinion of this committee, benefit in another way. Under the so-called "modified plan," commissions in stock and cash are provided for the bankers underwriting this \$70,000,000 of assessment. It has been repeatedly testified that if this assessment be reduced by the \$55,000,000 which the Chicago, Milwaukee & St. Paul owes to the government, no underwriting fees at all would be necessary. It therefore is obvious that the passage of this bill is the best assurance of relief to the stockholders of the Chicago, Milwaukee & St. Paul from very large and onerous assessments, and will remove all justification for commissions, in cash and stock, incident to an underwriting which this refunding will make unnecessary.

LOSS OF EYES in industrial accidents cost employers in the state of Pennsylvania last year more than \$800,000; which is several thousand dollars more than the total payments made by them for the loss of legs, arms and hands. This is the gist of a statement which has been issued by the National Committee for the Prevention of Blindness, 370 Seventh avenue, New York City. Eye hazards are the most serious of all non-fatal industrial accident hazards, says Mr. Carris, director of the blindness committee. This proportion as between eye hazards and other hazards has persisted since the passage of the compensation law.

MOTOR TRANSPORT SECTION

*Published in the fourth issue of
each month and devoted to
the co-ordination of rail-
way and highway service*



Discuss Rail-Highway Co-Ordination

*Railroad executives tell A. S. C. E. that future highway
transport depends on railways*

THE relationship of the railroads to modern highway and urban transportation was considered by the American Society of Civil Engineers at its spring meeting at Kansas City, Mo., on April 14. Ralph Budd, president of the Great Northern, and Britton I. Budd, president of the Chicago, North Shore & Milwaukee, were the speakers. Cheap transportation of the highest quality is the key to much of our past and pos-

sibly more of our future, Ralph Budd declared and such inexpensive transportation of high quality is made possible by the motor bus and the motor truck. Britton I. Budd, while devoting most of his address to the relationship of electric railways and motor bus transportation, presented an interesting discussion of the bus conditions from the viewpoint of an experienced operator. The addresses of both speakers are abstracted below.

Highway Transportation and the Railways

By Ralph Budd
President, Great Northern

In the past 25 years the American public has increased the investment in its transportation plant from 10½ billion to 50 billion dollars, and has increased its annual expenditure for transportation of property and persons from 1½ billion to somewhere between 18 and 20 billion dollars. The change has been most rapid in the last five years, when the investment has increased from 36 billion to 50 billion, and the annual transportation charge from about 12 billion to more than 18 billion dollars. This increase in the annual transportation charge in five years has been due entirely to the increased expenditure on highway travel, which has more than doubled in that time, while the charge for railway transportation has actually declined.

We are supporting two transportation plants, in each of which is invested upwards of 25 billion dollars. The property owned by the railway companies is reasonably permanent, while the equipment used on the highways is of more transient character. The annual cost of the transportation furnished by the railways is about one-half of that produced on the highways.

An inventory of the nation's transportation system at the beginning of 1926 would have disclosed something like the following:

Railways and Equipment		Improved Highways and Motor Vehicles	
Miles	251,000	Miles	495,000
Locomotives	70,000	Motor trucks	2,500,000
Freight cars	2,440,000	Automobiles	17,430,000
Passenger cars	56,500	Motor buses	70,000
Rail motor cars	500		
Total units	2,567,000	Total units	20,000,000
Investment	\$25,000,000,000	Investment	\$25,000,000,000
Annual cost	\$ 6,310,000,000	Annual cost	\$12,125,000,000

Five years ago it would have been like this:

Miles	253,000	Miles	370,000
Locomotives	70,600	Motor trucks	1,000,000
Freight cars	2,400,000	Automobiles	8,220,000
Passenger cars	56,150	Motor buses	5,000
Rail motor cars	50		
Total units	2,526,800	Total units	9,225,000
Investment	\$22,000,000,000	Investment	\$13,800,000,000
Annual cost	\$ 6,360,000,000	Annual cost	\$ 6,000,000,000

Twenty-five years ago the inventory would have been blank so far as modern highway transportation is concerned; railway investment would have been about \$10,500,000,000, and the annual cost of railway transportation about \$1,500,000,000, or only one-twelfth as much as the country's present annual transportation bill.

The railways today are as essential to our national and commercial life as ever, and anything that would jeopardize their success or efficiency should be avoided as a public menace. But other forms of transportation are factors too, and it is well to consider them in their relationship to the railways and to the general transportation scheme.

In the development of transportation one form has succeeded another with astonishing rapidity, but not without a struggle. Now, steam and electric lines, which had surpassed all others in the field of transportation, have encountered something that excels them both in certain particulars and under certain conditions. They find local traffic is taken from them by the most universal of all carriers, the motor car on the highway. As in former competitions between old and new means of transport, that which gives most of what the public wants will win. There must be speed, safety, dependability, comfort, convenience, and, in the case of public carriers, economy.

Why the Motor Bus?

Probably the questions most commonly asked by railway men concerning the motor bus are "What can its attraction be?" and "Is it not a fad which soon will lose its novelty and disappear?" Let us consider these questions. In many localities the bus does have some advantages over the railway train for local travel. Two of these are the greater frequency and the flexibility of its service. Compared with the railway train, the bus can give service at more frequent intervals, because each unit of service is small and may be operated cheaply in comparison with the cost of operating a train.

The ratio of cost of highway bus to steam train operation is about one to five, which means that for the cost of one train in each direction, say morning and evening, a bus can be run every two hours in each direction from 8 a. m. to 4 p. m., and this more frequent service better suits the needs of the average rural community. Owing to the extensive use of the private automobile there is scarcely enough travel even morning and evening on the average local run to justify a train, must less to justify several trains during the day; but the smaller and less expensive motor bus operating on the highway may pick up sufficient traffic to make it profitable. Besides greater frequency, there is the advantage of more convenient starting and stopping places. The motor bus is able to take on and discharge passengers at any street corner or at any house along the road. In other words, the motor bus is able to give a more flexible service than the train. People in the country can hardly use the railway for travel between neighboring stations, because, in proportion to the whole journey, the trips to and from the stations are so long. Not so with the bus. It gives continuous service all along the highway, while the railway gives it only at points four to six miles apart. Now, the amount of this strictly local business which railways cannot handle is considerable, and may be enough to insure the success of bus transportation.

Rail motor cars are being used rather extensively in lieu of steam passenger trains. They provide a unit of more suitable size, and economize by substituting the internal combustion engine for the steam locomotive, as well as in other ways. About 500 such cars of various types are in service, and the cost per mile for operation is about one-third the cost of running a passenger train. They are successful, therefore, to that extent, but are subject to the inherent limitations of any vehicle operating on railroad right-of-way. They cannot get as much "pickup" business as buses, which run along the highways and streets, and stop at houses, stores, offices, hotels, and any other desired place. The special field for the rail motor car is to take the place of the steam train on light traffic runs, such as branches and local and suburban districts where, for various reasons, service must be provided.

At recent hearings before the Minnesota Railroad and Warehouse Commission, Edgar Zelle, president of the Jefferson Highway Transportation Company, presented an analysis of the train and bus schedules in the territory served by his line south of St. Paul and Minneapolis. I quote the substance of what he said in respect to one community:

Owatonna is a town 77 miles from Minneapolis on two lines of railway. Seven daily trains give direct service to and from Minneapolis, but the schedules are such that service is concentrated morning and evening, without any trains during long intervening periods. For example, of the seven northbound trains, three leave within 1 hour and 17 minutes of each other, with a fourth trailing just an hour later, all four of these trains leaving before 7:30 a. m. After this there is no more morning train service, and only three more trains left for the balance of the day. One of these, a limited, leaves at 1:10 p. m., and then the other two locals keep each other company, both of them leaving around

4 p. m. within 38 minutes of each other. Thus, six-sevenths, or 86 per cent of the northbound rail passenger service at Owatonna is used to give service at but two periods of the day.

Southbound service shows another abundance of rail service at two particular periods. A train arrives at 10:23 a. m. with another close behind at 11:30 a. m. Then everything is quiet until 5:20 p. m., when the first train arrives, with another at 6:43 p. m., followed immediately at 6:59 p. m. with still another. On southbound service the railroads thus concentrate five-sevenths of their passenger service at two periods of the day.

The Jefferson Company, on the other hand, because it uses a type of equipment that can be distributed economically for local passenger service, gives Owatonna service from the north every two hours from 11 o'clock in the morning to 11 at night.

That the public appreciates a frequency of service that is spread over the day at regular intervals is illustrated by the traffic records of the Jefferson Company. Over the twelve months' period ending August 31, 1925, there is a surprising uniformity of patronage, ranging from 27 to 38 passengers handled daily on each of these two-hour scheduled southbound runs. The northbound records show a similar uniformity, beginning with the first through run out of Mason City, leaving at 7:15 a. m. which carried 13,323 passengers, to the 5:15 p. m. run, which carried 15,123 over a period of 12 months, ranging from 31 to 41 passengers handled daily on each of these northbound runs.

The same uniformity is illustrated in the 19,831 passengers who used the outboard service at Owatonna. The pleasant month of June, with 1,342 outboard passengers, was the lightest month, while the cold month of January was the heaviest month, when 1,959 outboard passengers were taken out of Owatonna, averaging 45 per day in June to 63 per day in January.

Owatonna, credited in the last census with a population of 7,252, furnished the Jefferson buses with a total of 37,928 in-and-outbound passengers in the twelve months' period.

This two-hour bus service is not only patronized at small stations where the railroads restrict their service, but also at any point between stations. The cross-roads or any point on the highway is the stopping place of the bus.

While inapplicable to the territory adjacent to our largest cities or to sparsely settled regions, I believe the condition described by Mr. Zelle is fairly typical of a great part of the country.

For short distance travel the most ideal way yet devised is by the private automobile. This is an important truth, because it accounts for most of the development in motor bus transportation and most of the railways' loss of passenger traffic. For those who do not have their own automobiles, or having them, prefer occasionally not to drive, the motor bus affords a substitute.

The congestion of city streets has become a serious problem for the automobile user. In all cities, during the busiest hours of the day, much of the advantage of the automobile is lost for lack of parking space on the streets. This problem is having attention, and doubtless to some extent it will be solved by providing convenient places for parking cars near business centers. The cost of such parking, however, will influence some private car users to avoid the congested centers. In very large cities the bulk of commutation travel probably can be handled only by railway trains, subways, and elevated lines, but there seem to be many cities where the street congestion is not too great for motor buses, yet is too great for private cars to operate conveniently, comfortably and economically. In such places the motor bus has positive advantages.

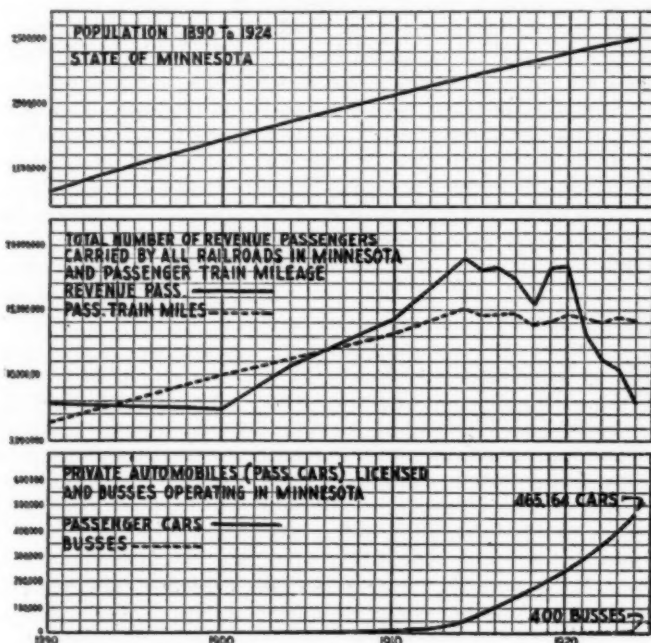
The Automobile and Local Travel

In connection with these questions of frequency and flexibility of service, which are the main advantages of local highway over local railway passenger service, let us consider whether the railways really lost their business to motor buses or to private automobiles. Statements submitted to the Minnesota Railroad and Warehouse Commission recently indicate that the railways in Minnesota had lost a substantial part of their local passenger traffic before motor buses began operating to any extent, and that the number of automobiles continued to increase as the number of passengers carried by railways declined; also that at stations where motor buses have been operating for some time, the loss of passenger business has not

been materially greater than at stations where they never have operated.

I submit, as Appendix "A," a chart showing passengers handled by the railways in Minnesota since 1890, passenger train miles, automobiles and buses in Minnesota, and population; as Appendix "B," similar information for the United States; and as Appendix "C," a tabulation of ticket sales at 26 railway stations in Minnesota. At 15 stations, where there was no bus competition, the decrease in passenger tickets sold in 1924 compared with 1920 was from 49 per cent to 76 per cent, with an average of 64.6 per cent. At eleven others, where there was bus competition, the decrease was from 55 per cent to 74 per cent, with an average of 63.7 per cent. The total number of tickets sold at the 26 stations in 1920 was 488,649, and in 1924 was 175,706, a decrease of 312,943, or 64 per cent.

APPENDIX "A"

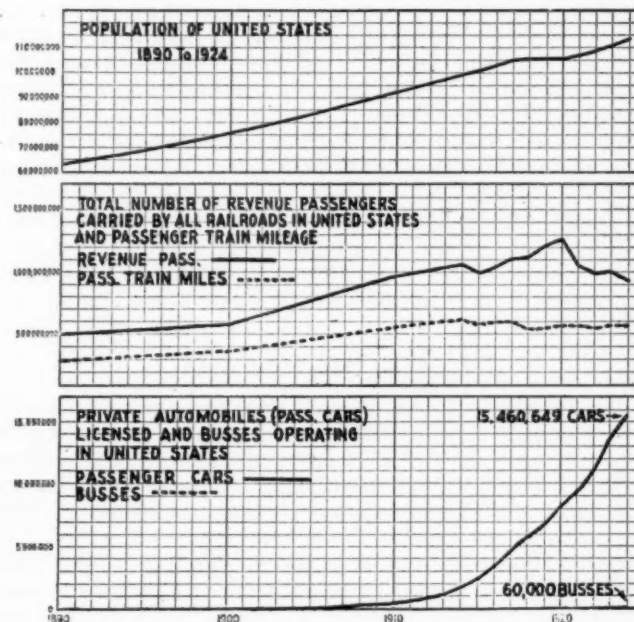


During the five years, 1919 to 1924, the total number of passengers handled by the railways in Minnesota decreased from 18,274,516 to 7,905,378, or 56.7 per cent; while passenger train miles on these railways increased from 14,052,547 to 14,223,456, or 1.2 per cent; and the number of motor vehicles in the state increased from 259,741 to 503,437 or 93.8 per cent. Compared with 1919 the year 1921 shows a decrease of 4,902,444, or 26.8 per cent in railway passengers; an increase of 535,584, or 3.8 per cent in passenger train miles; and an increase of about 60,000, or 25 per cent, in automobiles, while buses had not yet become a factor.

These and other data point to the conclusion that the private automobile has had a great deal more to do with the loss of railway passenger business in Minnesota than the motor bus. They also suggest, and railway statistics support the suspicion, that before bus operation began, the local passenger traffic of the railways in Minnesota had decreased to a point where much of it was being done at a loss, largely because passenger train miles had not been correspondingly reduced. Manifestly, the taking off of passenger trains in such instances is justified. Every train that is removed, however, serves to increase the advantage of the competitor on the highways; but if the business disappeared while the railways service was maintained, there is hardly reason for continuing such trains. Whatever may be the various reasons, local travel, to a very large extent, has left the railway train for the auto-

mobile and bus. This patronage of buses seems to establish beyond any doubt that they will continue; and probably will increase in number. From the foregoing it seems clear that the railways must recognize that public necessity and convenience require the development of

APPENDIX "B"



transportation upon the highways; that they should not attempt by arbitrary means to eliminate motor vehicle competition and should only insist that such competition be subject to proper public control; and further that they

APPENDIX "C"

Record of Tickets sold in the years 1920 and 1924 at Fifteen Stations in Minnesota where there was no Bus Competition.

Station	No. of Tickets Sold		Decrease	PerCent
	1920	1924		
Benson.....	35,371	11,557	23,814	67%
Browns Valley.....	5,882	1,773	4,109	70%
Clara City.....	7,665	2,420	5,245	68%
Cottonwood.....	7,371	2,393	4,978	68%
Granite Falls.....	16,680	5,583	11,097	67%
Hallock.....	10,569	5,345	5,224	49%
Hanley Falls.....	10,925	3,011	7,914	72%
Herman.....	8,196	3,099	5,097	62%
Monticello.....	12,924	4,600	8,324	64%
Ruthron.....	5,790	1,722	4,068	70%
Warren.....	16,844	7,739	9,105	54%
Ortonville.....	2,743	1,005	1,738	63%
Odessa.....	272	66	206	76%
Appleton.....	10,562	3,268	7,294	69%
Milan.....	312	115	197	63%
Total.....	152,106	53,696	98,410	64.6%

Similar Record at Eleven Stations where there was Bus Competition.

Station	No. of Tickets Sold		Decrease	PerCent
	1920	1924		
Alexandria.....	37,398	15,429	21,969	59%
Delano.....	11,376	2,909	8,467	74%
Evansville.....	10,491	3,153	7,338	70%
Fergus Falls.....	59,422	26,868	32,554	55%
Jasper.....	12,624	4,460	8,164	65%
Litchfield.....	38,094	10,310	27,784	73%
Marshall.....	27,312	10,658	16,654	61%
Osakis.....	14,790	4,184	10,606	72%
Park Rapids.....	13,459	5,612	7,847	58%
Sauk Center.....	35,244	10,519	24,725	70%
Willmar.....	76,333	27,908	48,425	63%
Total.....	336,543	122,010	214,533	63.7%
Grand Total.....	488,649	175,706	312,943	64.0%

should seriously consider whether or not this new form of transportation, from the public as well as their own point of view, cannot be more advantageously conducted under railway direction than otherwise.

Whether a railway company itself should own and manage buses may depend upon its willingness or unwillingness to take on additional obligations and responsibilities; but if no prejudice exists against bus operation, the deciding question probably will be whether, by such control, wasteful duplication can be eliminated and the service improved. There have been instances where, by co-ordinating the schedules, bus service has supplemented train service, to the end that for a lesser total expenditure a more complete and satisfactory service has been rendered. Each case is one for individual consideration. In many places throughout the United States electric lines have abandoned all or part of their tracks, and substituted bus service. In other cases, notably in New England, steam roads have substituted buses and trucks for branch lines.

Cost of Bus Operation

The question of cost of operating buses is vital for the future of that form of transportation, but reliable records have not been kept long enough to establish what might be called normal costs for certain routes or localities, as is the case with transportation costs on the different divisions of railway systems.

The *Railway Age*, in its issue of March 27, 1926, published an article entitled "What Does it Cost to Operate Buses and Trucks?" in which detailed estimates of the cost of operating a city type bus in New York are given. These costs vary from 23.6 to 30.6 cents per bus mile, depending upon whether the bus averages 200 or 100 miles per day. I have examined the details of these estimates and compared them with cost data with which I am familiar, and I believe they are as reliable as can be found at this time, taking into account the fact that local conditions will determine several of the items in any such estimate. But the cost of bus operation should be at least 15 per cent less than it is, and unless it is reduced that much the business will not grow to its full possibilities.

The bus has come a long way from its origin in the motor truck, but it is not perfected yet. The March 15, 1926, issue of the *Commercial Car Journal* lists the different makes and types of motor bus chassis designed exclusively for passenger transportation. In this list are shown 96 types put out by 46 manufacturers. Standardization should result in substantial reduction in first cost, and the lessening of obsolescence would reduce the amortization or depreciation charges. The items of oil and gasoline and tires, of course, would come down automatically if a car weighing 9,000 lb. could be substituted for one weighing 12,000. Cost of insurance also will be less as the business is stabilized. With lower costs, rates can be reduced and travel increased. I believe many people living along bus routes will take buses to town instead of driving their own cars, especially if the fare is low enough. Here is an opportunity to render a service to rural communities, and I believe it is a logical development in rural transportation for the bus to take the place of the private car on many occasions.

The Motor Truck

There are about 2,500,000 motor trucks in the United States. About 95 per cent of them are non-common carriers, and are not subject to regulation as to rates or service. They are successors of the horse-drawn warehouse, transfer and delivery vehicles, and of the farm wagon, but the motor has given them radii of operation many times those of their predecessors. In freight, as in passenger business, the railway is supreme in the long

distance field. It is also supreme in the handling of the great volume of bulk commodities, such as coal, ore and grain. Indeed, there is nothing in the records of truck transportation to indicate that trucks are or can be contenders for any railway freight, except where the convenience of direct door-to-door delivery, together with the saving of terminal trucking and handling, outweigh the extra ton-mile cost of moving freight by truck on the highway over the ton-mile cost of railway line haul.

The principles governing the regulation and taxation of commercial freight carriers on highways are similar to those governing buses but the handling of freight is so different from the handling of passengers that the truck bears a relationship to railroad freight service different from that of the bus to railroad passenger service. Freight shippers are interested solely in dependable, prompt and cheap transport, whether the shipment be over a long or a short distance. The charge for freight service is important, but the question of economy does not enter into the vast bulk of local passenger travel which moves by private automobile. The flexibility and elasticity of truck operation; that is, its ability to make door-to-door delivery and to give radial service to both rural and urban communities, gives it a large field of activity. The elimination of one or two handlings and the consequent saving in time amounts to more than the excess cost of road haul by truck over that by rail up to some undetermined distance beyond the terminal. What that distance is no one knows. So many variables enter into the problem, such as the amount of freight available on a given route, the character of the commodities, the relative importance of direct delivery to store doors, the extent to which return loading is obtainable, climatic conditions, the condition of the highways, etc., that only actual experience can determine how far beyond the city in each instance the truck can take the place of the box car. The horse-drawn truck excels the motor truck only for such freight as involves short movement and long delay in loading and unloading; the motor truck similarly excels the railway only where the distance involved is short enough so that the saving and convenience in terminal cost and handling offset the higher cost of transit by highway over railway, and only for comparatively small units of freight.

Railways are using trucks to assemble freight in cities in lieu of switch engines, and in some cases operate lines of trucks in lieu of local freight trains. Especially in large and congested terminals the use of trucks, whether by the railways or by others, is economical because local freight trains, due to the light tonnage, station work and heavy switching cost incident thereto may be and often are unprofitable. Unlike the case of passenger traffic, freight train mileage may be reduced approximately in proportion when freight traffic declines.

Discussion

The discussion of Mr. Ralph Budd's address was opened by John V. Hanna, chief engineer of the Kansas City Terminal, who said in part:

The subject of "Relation of Highway Transportation to the Railway" is not simple. It involves the relation of charges for service to the cost of rendering that service, which is a recognized factor in formulating railway tariffs and has new features peculiar to the motor bus and motor truck.

There is little doubt that the service now rendered by the accommodation train, traveling 75 to 150 miles, made up entirely of day coaches, would, for most passengers, be more acceptably rendered by a line of buses with more frequent service but carrying smaller numbers in each unit. There is, also, in some cases, a proper use of the bus as a feeder for the railroad. In that case schedules

must be arranged to connect closely with the railroad trains and there are cases where branch line service, now given by train, may be given by the motor bus. The cases where the considerations indicated justify the establishment of bus routes can only be determined by thorough examination of all the features of each individual case. This has been done by a number of the steam roads and bus service has been inaugurated.

The movement between the freight house or team yard of the railroad, from the door of the shipper to the door of the consignee, has not been handled by the rail company until a comparatively recent date and even now the practice is not common. The cost of the truck part of the complete movement has always been paid ultimately by the consignee or consumer as a necessary part of the whole transportation charge. Except for the reluctance of railroad managements to add to their machinery for the transaction of business, there appears to be no sound reason why the rail company should not handle the entire goods movement from origin to destination.

It would manifestly be a convenience, both to the shipper and consignee, if store-door pick-up and delivery were the general practice and the entire movement made under one bill of lading and the collection of charges made by one agency. There should be no increase in the total cost of the movement. There would be a possibility of a slight decrease in cost of all trucking to and from the freight house were performed by one agency instead of a number of unrelated concerns.

It is evident from a little reflection, that once this trucking unit is organized, its operation can be extended to road haul so long as the distance traveled is kept within economical limit.

For example, an l.c.l. movement of say 30 miles by rail requires that the merchandise be loaded into a truck, taken to the freight house, unloaded and placed in a car, the car switched into a local freight train, hauled the 30 miles, set at the freight house or unloaded by the crew of a local freight train, the goods then loaded into a truck, carried to the place of business of the consignee and unloaded. If this movement were made entirely by truck we would eliminate one unloading and one loading of the truck, the loading into the car, the rail movement and the unloading from the car. The movement in the truck would undoubtedly mean a higher ton-mile cost than the rail haul considered alone but a point must exist where the total of all costs for the combined rail and truck movement would exceed the total cost of the truck movement. Beyond this point, the transfer from truck to car and vice versa would be justified by the lower cost of the rail haul. Short of this point the all-truck haul would be cheaper. Without an analysis of cost, the length of profitable truck haul cannot be determined. It will vary with local conditions and type of equipment used.

Locating and Paying for Highways

The question of highway location, distribution of federal aid road funds and taxation of motor vehicle common carriers were emphasized by E. A. Hadley, chief engineer of the Missouri Pacific, in his discussion. He said in part:

When and how a line of highway should depart from its general course to pass through a small city or town or to give service to an agricultural or industrial community is a problem which cannot be settled by any predetermined rule, nor is it likely to be settled to the satisfaction of all parties concerned. The question of deciding locations for highways where only natural physical conditions are involved causes less trouble to the engineer than where features of ultimate development of the territory to be served must also be considered. A highway so located that it serves as a direct feeder to other trans-

portation lines is a distinct service to the community as a whole, and it is in the construction of such highways that the railroad company finds itself most favorably interested.

Beginning with 1916 when the federal government appropriated \$75,000,000,000 to be allotted to the states in annual appropriations over a five-year period on a graduated scale, the government has increased such appropriations made for the years 1917 to 1926 inclusive have amounted to \$615,000,000. It is to be presumed that these funds of the federal government have been accumulated by taxation under which the railroads have at least paid their proper proportion, and as property owners and taxpayers in the several states, are therefore entitled to their proper share in the distribution of federal aid to the states in highway construction. Unfortunately this view does not seem to wholly prevail in certain states, and those in authority, having in charge the projects or portions of projects on which federal aid is distributed, leave out of consideration the railroad company's interests in the application of such federal aid as is secured. In other words, the federal aid has been applied to projects which have not involved separation of grades with the tracks of a railroad company, and the division of cost of such separation of grades as are required, has been divided between the state and the railroad, eliminating therefrom any consideration of federal aid funds allotted to the state for highway work. In my opinion, this is not entirely fair to the railroads, and we are setting up the claim that federal aid should be prorated in such manner that the railroad companies will benefit in the same proportion as other property owners and taxpayers in the community.

There has been complaint from the railways because of the general and special taxes they are obliged to pay to help construct and maintain highways, upon which motor vehicles compete with them. Spokesmen of the motor industry sometimes have replied by showing that the total taxes paid on motor vehicles are larger than on railroads and by referring to the large amount of freight business that the motor manufacturing industries give the railways. The fact, however, must not be lost sight of that part of the taxes collected from the railways are used to pay for the highways upon which motor vehicles operate, and that none of the taxes paid on motor vehicles are used to help provide highways for the railroad trains.

There appears to be a general agreement that taxation should not be adopted for the purpose of strangling highway transportation, and the conservative element on both sides of the question advocate a tax schedule which will impose a fair share of the cost of construction and maintenance of highways upon trucks and buses without unduly burdening them or restricting the development of this form of transportation.

Future Truck Uses

F. G. Jonah, chief engineer of the St. Louis-San Francisco, in his discussion, pointed out opportunities for savings by the use of motor trucks in freight terminals. He also said that the railways are in the position to make the best use of the new transportation facilities at the lowest cost.

Concluding the discussion of Mr. Budd's address, C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul, spoke of the relationship of the railroad to urban traffic. He called attention to the fact that in many cities the location of railroad terminals and facilities was not perfectly adapted to present traffic conditions. This came about, he said, as a result of the rapid growth of cities, changes in general living conditions, the large increase in volume of traffic and the value of land. The result was congestion of traffic ways, restriction of growth and development of both the city and the railway, a re-

duction in efficiency, and other adverse conditions which affected the entire community, including the railways. Even if the automobile and truck could have been anticipated, he said, it is doubtful if provision for present day

traffic could have been adequately determined upon. It is a question whether our planning today will prove to have been done with greater vision and with the assurance that it will meet future conditions.

An Experienced Operator's View of the Bus Situation

By Britton I. Budd

President, Chicago, North Shore & Milwaukee

Rapid development of the bus in the urban and inter-urban transportation fields has given railway operators a new problem. That problem is to find the best and most economical use to which the motor coach can be put, then to fit it into its proper place in our transportation system.

The demand for motor coach service in the last three or four years may be said to have come directly from the traveling public. We have been living in an era of great prosperity in which the use of the private automobile has reached a point where it almost equals one for every family in the country. The comfort and convenience of the automobile have created a demand for de luxe travel and the motor coach has appeared to meet that demand regardless of economic law which under less prosperous conditions would be a determining factor.

It is the business of transportation companies to supply the public with the character of service it demands. If the public prefers to ride on rubber tires at increased cost, the transportation company must supply that service, even though it may not be the most economical.

Co-ordination of all our transportation facilities so that each may be assigned to the kind of work it is best fitted to perform is the problem which must be solved before the future of the motor coach can be forecast with any degree of accuracy. The country must look to the existing transportation companies, steam and electric railway operators, to work out the solution. They are the men who by training and experience are qualified to perform this service.

Many motor coach operators made the mistake of establishing rates of fare on a competitive basis with electric railways. Motor coach service costs more to produce than electric railway service and it probably always will. But the public demands this special service which more nearly approaches the comfort and convenience of the private automobile. The public has shown its willingness to pay a higher rate of fare. This is seen in the patronage given the motor coach in New York, Chicago, St. Louis and other large cities where higher fares are charged than on the electric railways.

Although no general rule can be laid down to apply to every situation, either with respect to motor coach operation or the rate of fare to be charged, experience indicates that in interurban service the rate should be from one-third to one-half more than the railroad rate. The future of motor coach industry depends on its being made self-supporting.

The largest item of expense in the upkeep of the private automobile is depreciation, an item that escapes the attention of many users. That item alone exceeds all other expenses of upkeep, including gasoline and tires, garage rent, insurance and repairs. In a measure the same applies to the motor coach. Manufacturers are constantly making improvements in motor coaches as they learn more by experience. The public must have the latest or patronage will fall off. Just as the owner of the private automobile will exchange his car long before it is worn out so as to obtain a newer model, so must the motor coach operator keep up with the latest styles.

With greater experience no doubt the depreciation costs on the motor coach will be materially reduced. Not

enough attention has been paid to this phase of operation. Railway companies which exercise the utmost care in seeing that their railway equipment is maintained in the highest stage of efficiency, provide few facilities for maintaining their motor coaches in the same way. They would not employ any but the most highly skilled workmen to inspect and repair their railway equipment, yet will entrust their motor coaches to the care of inexperienced and unskilled men. There is no doubt that operating costs are many times made higher than necessary from this cause.

If motor coach operation is to be made successful more attention must be given to garaging facilities and the use of proper equipment for maintenance. Careful studies must be made of tire costs and gas consumption. We have arrived at the stage where the motor coach must be considered as much a part of a transportation system as the electric car and the costs of operation studied as closely.

City motor coach operation and interurban or inter-city operation are separate and distinct propositions. The type of equipment that might prove satisfactory in city operation where the length of ride is comparatively short, would not meet the requirements in inter-city service. Motor coaches engaged in long haul operation must be attractive in type and comfortable. Where they are in constant service on regular routes, it may be necessary that they should be quite as luxurious in furnishings as the types used for special tours, but they must be greatly superior to the ordinary type used in city service.

In interurban and inter-city service motor coach schedules must be arranged with great care. They must provide for convenient rest stops and public comfort facilities. These conveniences must be counted in the capital investment and in the cost of operation and maintenance, things which many irresponsible independent operators did not consider.

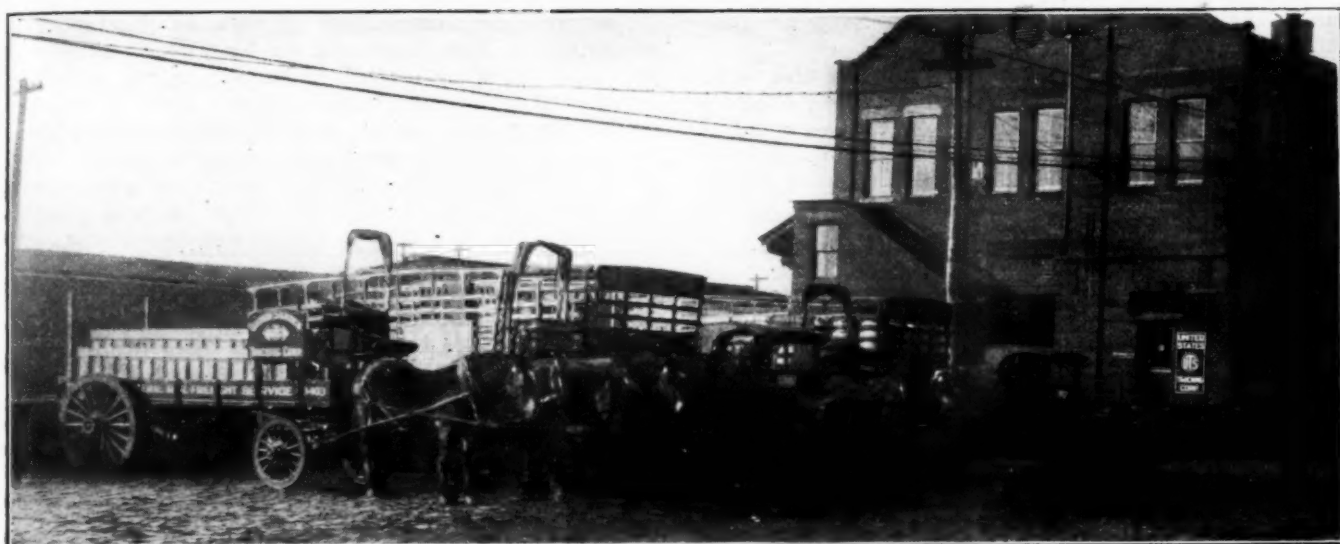
In summing up the motor coach situation in the urban and interurban field some fairly definite conclusions may be drawn from the experience we have gained.

In the suburban and interurban fields the motor coach is most successful for comparatively short hauls of 20 miles or under. In long haul traffic it is not as useful or as economical an agent as the high-speed electric railroad and should not be operated in territory served by rail. As an auxiliary to the railroad the motor coach has its greatest usefulness in the interurban field, as it can be used to serve territory contiguous to the railroad for a distance of 25 miles or more.

That the cost of operating motor coach service is greater than the cost of supplying rail service and that is always likely to be so.

That railway operators with their special training and experience are the men best qualified to operate motor coaches and co-ordinate them with the railways.

That in the near future, under a properly co-ordinated transportation system, the motor coach business will simmer down to a sound economic basis. Where it will be found economical to operate motor coaches they will be run and where it is found that the public will be better and more economically served by rail lines, the latter will carry the traffic.



Erie Freight Station at Jersey City Where Cars and Motor Trucks Meet

Off-Line Stations and Store-Door Service in New York

*Erie and Lehigh Valley use motor trucks to improve service
—Reduce car floating and pier rental*

TWO railroads, the Erie and the Lehigh Valley, are making extensive use of motor vehicles through contract with the United States Trucking Corporation in reducing freight handling costs and improving service to shippers in New York. New York is a peculiar terminal from a freight standpoint. Only one railroad, the New York Central, has direct all-rail freight service into the heart of Manhattan. All the other trunk lines must depend upon rail-water terminals, where cars of inbound freight are placed on car floats and towed to pier freight stations in various parts of the metropolitan area. These pier freight stations are variously located to serve different parts of the city, in Brooklyn and at various points along the East and North river waterfronts of Manhattan and the Bronx.

Little freight except that from and to the New York Central enters or leaves the city without a water trip. The New Haven, to be sure, has a rail terminal at 129th street whence freight to and from the northern part of the city is handled, but New Haven freight destined to downtown points is floated down the East river to downtown piers. There is, of course, direct rail service to parts of the city (the outlying boroughs of Brooklyn and Queens) served by the New York Connecting and the Long Island. On the other hand, a large part of the freight handled by these two lines must first be floated to reach them. And, too, the New York Central has to float all freight for its West Shore line.

Handling freight on car floats is a costly business—particularly when the distance is short. That is to say, it takes just as many costly waterside rail facilities and just as much time and labor to put a car over a float bridge for a trip of a mile across the Hudson from Jersey City to Lower Manhattan as it does for the comparatively long trip around the Battery and up the East

river to Harlem. It is, then, the comparatively short water trip where the disadvantage of floating cars as compared with handling the freight by motor truck on existing ferries is first evident and it is in this area—the lower part of Manhattan—which is closest to the New Jersey terminals of the Erie and the Lehigh Valley, that the motor freight service by contract with the United States Trucking Corporation is offered.

Saving Pier Rent at New York

There are other elements in delivery of freight to New York by car float which have to be considered. Water front property is extremely valuable. If all business is to be handled by car float, increases in business mean constant additions to rail-water terminal facilities. The railroad pier freight stations in New York are virtually all held under lease and the rents are extremely high. Handling freight by motor truck from the railroad terminal on the New Jersey side of the river, instead of in cars on a car float, enables the establishment of New York stations at warehouses away from the water front in quarters which, while more convenient to shippers, are not so costly.

Direct Collection and Delivery Optional

The United States Trucking Corporation operates five such "inland" stations in Manhattan, serving shippers and consignees south of Twenty-third street. All merchandise, inbound and outbound, of the Erie and the Lehigh Valley in this area is handled by motor truck to and from Jersey City via ferry. All of it, except that in direct collection and delivery, passes through one of these five inland freight stations. These inland stations are operated on the ground floor of warehouses. Incoming freight is held for the consignee's 48 hours free time or,

if the shipper so desires, it is promptly warehoused for him and is subject to his further orders at regular warehouse rates.

The close affiliation between the railroad and warehouse service is an important feature for some shippers. The average difference in the rate on carload and l.c.l. freight will pay for from three to four months of warehousing. Consequently the shipper selling small quantities of his product in the district from day to day can

This direct delivery of course is an additional advantage to the consignee, particularly in view of the vehicular congestion in New York and the long delays often experienced in getting a truck to its place at the outbound platform of a railroad freight station. Nevertheless, the service was a new one to shippers and one which they had to learn to use before it enjoyed any wide popularity. At the outset of these operations, direct delivery service was utilized on but 7 per cent of the inbound freight.

UNITED STATES TRUCKING CORP. FREIGHT SERVICE DEPARTMENT					DRIVER'S LOAD TICKET T. C.		Nº 60377		
INLAND STATION _____					DATE _____				
DRIVER'S NAME _____			TRUCK NO. _____						
USTC OR SS PRO	✓	CONSIGNOR	CONSIGNEE	DESTINATION	STEAMER	NO. PKGS.	WEIGHT	PREPAID CHARGES	CARTAGE

Fig. 1

afford to ship it in by the car load, pay a warehouse fee for a portion of it for a short period and still be the gainer over the alternative practice of shipping in small quantities of his commodities every few days under l.c.l. rates.

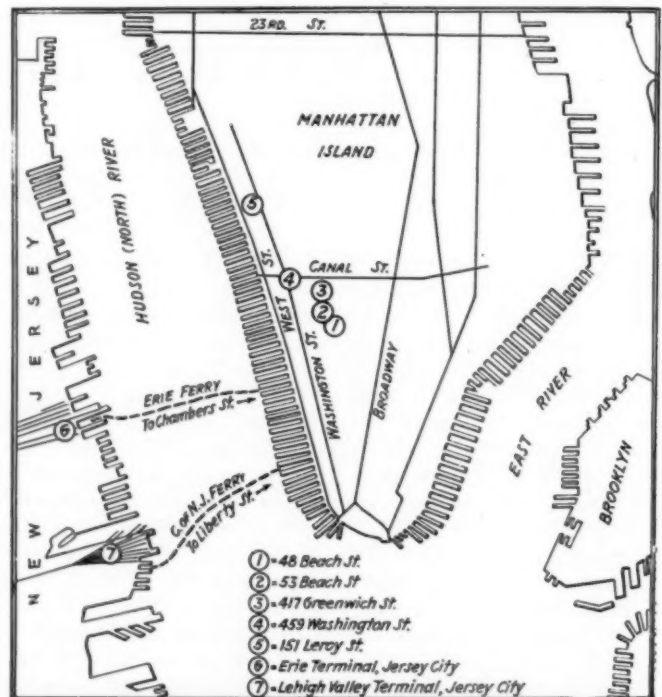
In addition to the motor truck service to the inland station, however, the railroads, in conjunction with the Trucking Corporation, offer direct collection and delivery to patrons who desire it. The contract of the railroads with the Trucking Corporation calls for the payment of a portion of the through rate for carting freight from Jersey City to the inland stations or to West street, New York. The Trucking Corporation, in view of the fact

This has now increased to 57 per cent. Direct collections are made on the same basis of cost, the shipper paying only for the trip to the New York waterfront and the railroad paying for the balance of the trip to

ERIE RAILROAD COMPANY UNLOADING TALLY AND DELIVERY RECORD				
Car Initial _____	Car Number _____	Track _____	Date _____	
Seals North Side _____	South Side _____	East End _____	West End _____	
Condition of Drip Pans _____	Drain Pipes _____	Car Floor _____		
Quantity of Ice in Tanks _____	Time Load Started _____	Finished _____		
U. S. Truck Number _____	Public License Number _____	Checker's Name _____		
Driver's Name _____	Truck Dispatched to _____			
<small>MAKES DAMAGE NOTATION IMMEDIATELY BEHIND ERY TO WHICH THIS APPLIES SHOWING NATURE, EXTENT AND APPARENT CAUSE OF THE DAMAGE</small>				
CONSIGNEE'S NAME AND MARKS	ADDRESS	RETD. OF PACKAGE	TALLY	TOTAL
<small>RECEIVED ABOVE PROPERTY FROM ERIE RAILROAD COMPANY IN GOOD ORDER</small>				
Sheet Number _____	Total Sheets _____	Driver's Signature _____		
<small>WHEN MORE THAN ONE SHEET IS USED ON ONE CAR, ALWAYS SHOW CAR NUMBER ON EACH SHEET ALSO NUMBER OF SHEETS USED</small>				
<small>MAKE NO NOTATIONS ON BACK OF THIS SHEET</small>				

Fig. 2

that the shipment on arrival at West street is already loaded on its truck, offers delivery to the consignee in downtown New York at a much lower rate than if the same haul were made by individual trucking concerns, the cost of loading being also absorbed by the Trucking Corporation. Consequently the additional cost to the consignee of direct delivery is often less than he could handle it for himself, even with his own fleet of trucks from the "inland" or pier freight stations in New York.



Inland Stations (No. 1 to No. 5) and Area Where Direct Collection and Delivery Is Offered

New Jersey. Of outbound freight handled by the trucking company 52 per cent is collected at the shippers' places of business on this basis.

Aside from the advantage of direct collection and delivery to shippers, the service effects important savings for the railroad companies by reducing the number of costly piers which must be rented on the New York side and also in the incidental handling of shipments on such piers. The direct trucking arrangement provides that cars be placed on team tracks on the Jersey shore, consignees notified immediately upon arrival and arrangements made to truck the freight direct from the car to the consignee's place of business, at his convenience.

Practically the same arrangement is in effect covering this procedure as from the New York piers; i.e., consignees have the benefit of 48 hours free time, after which demurrage or storage charges are assessed in accordance with tariff regulations. The railroad companies pay the Trucking Corporation for the cost of trucking shipments to the New York side and consignees pay for the trucking from that point to the ultimate destination. This transaction saves time and reduces cost to the shipper. If the shipment were picked up at a New York pier, the consignee would be obligated to pay a loading charge of not less than 60 cents per ton, whereas, by taking the shipment through direct delivery channels, this cost is eliminated, the shipment being already loaded on a truck when it reaches New York, the point when the consignee begins to pay for the service. Similar arrangements cover direct collection i.e., con-

Fig. 3

signees pay for the cartage from their places of business to the New York side of the Hudson river and the railroad company pays from that point to Jersey City.

The Trucking Corporation in the receiving and delivery of freight is the agent of the railroad. It receipts bills of lading and collects freight charges. In direct collection and delivery and in its warehouse service it is also agent of the shipper or consignee. When outbound freight is received at one of the inland freight stations, it is weighed by the trucking company's checker, the bill of lading receipted and the shipment loaded on a waiting vehicle for haulage to Jersey City. Information from each duplicate bill of lading loaded into the vehicle is entered on a triplicate form (Fig. 1) of which one is kept at the inland station and the other two sent, attached to the bills of lading, with the driver to Jersey City. There with this list and the bills of lading the railroad checkers account for each piece of freight as it is unloaded from the truck.

Similarly with inbound shipments, a tally list of the lading of each truck (Fig. 2) is receipted to the railroad company by the trucking company's driver who takes a copy with him to the inland freight station at New York, where the individual articles are checked off as they are unloaded. The list is then filed in a book and when cartage agents call for the various shipments they are required to sign in a column opposite each shipment by way of receipt.

Direct collection and delivery service is largely restricted to carload shipments. On outbound direct collection freight, the trucking company's vehicles do not stop at the inland stations to weigh the shipments, but proceed to Jersey City where the weighing is done.

With direct collection freight the railroad issues and receipts the bill of lading to the trucking company at

Jersey City as the shipper's agent. The trucking company pays any freight charges, acting also as the shipper's agent, and sends him the bill of lading.

On inbound direct delivery freight the railroad company makes out a tally sheet of the articles, as is usual in the case of freight destined to the inland stations. A copy of this does not go to the consignee, however, but is retained by the trucking company. The trucking company lists the contents in each vehicle on one of its own delivery sheets (Fig. 3) and the driver secures the signature of the consignee on each by way of receipt. Unloading of inbound freight is performed by the Trucking Corporation at its expense. The railroad loads outbound freight at its expense.

Equipment and Operating Practice

The great bulk of this operation is handled by tractors and trailers, although where congestion creates delays some horse-drawn vehicles are still in use. The tractors, of which there are 8, are Macks and the trailers, of which there are 36, are bodies built by the Trucking Corporation in its own shops on Lapeer trailer chassis. These trailers have a capacity of 20 tons each—although, of course, this lading is seldom reached except with commodities of small bulk in proportion to weight. It takes from three to five trailers to keep one tractor busy. Inbound and outbound operations continue throughout the day. A tractor will bring a loaded trailer into an inland station, spot it for unloading, and immediately start with a trailer already loaded with outbound freight for Jersey City. There it will leave its load with the railroad and pick up another load for New York. By the time it has reached New York again, the inbound load it took to New York on the previous trip will have been unloaded and the trailer loaded again with outbound freight. A tractor will average seven round trips a day.

In the evening just prior to the closing hour the Trucking Corporation makes it a practice to remove all freight from inbound cars at Jersey City in spite of the fact that it is too late to effect delivery in New York that day. This releases the cars. The trucks are then housed in a pier on the Jersey side for the night under the surveillance of a watchman. Tractors coming from New York on the first trip the following morning with empty trailers for the first loading of inbound freight spot their empties and then take the loads waiting for them on the pier, obviating the necessity of killing time prior to the first inbound loading.

Gas-Electric Drive for Motor Buses*

By H. L. Andrews

Assistant Engineer, General Electric Company

WE perhaps think of electric drive as applied to motor buses as a recent development, but as a matter of fact records indicate a sustained activity and endeavor in this field for more than 25 years. The first important installation was made in 1905 when a single-deck, 30-passenger bus so equipped was placed in operation on Fifth avenue, New York, and this was followed three years later by ten 34-passenger buses on the same route which operated in regular service until 1914. The fact that the basis idea of electric drive has persisted throughout all these years is evidence that the practice of shifting gears with several reductions in com-

*Abstracted from an address delivered on April 16, before the New York Railroad Club at its annual "Electrical Night."

bination with a clutch for disconnecting the internal combustion engine, has not met all requirements and furthermore, that the advantages which come with electric drive—simplicity, continuous torque, ease of control and durability—are desirable features to be incorporated in automotive transportation. Electric drive has, therefore, been called upon to supply a transmission better adapted to utilizing the characteristics of the gasoline engine.

With the recent rapid expansion of motor buses in the transportation field, particularly in the larger cities, traffic conditions demand a vehicle of large seating capacity, which materially increases the weight and this in turn requires more engine power. As these applications are being made largely by transportation men accustomed to rail operation, schedule speeds comparable with those obtained on rail lines are demanded.

While the internal combustion engine has been brought to a degree of perfection where its reliability need be no longer in question, to utilize best its constant torque characteristics for transportation purposes with its requirement of widely varying torque and speed it is necessary to provide some means of changing the torque ratio between the engine shaft and the driving wheels. As the torque of this type of engine has definite limits the engine would necessarily be very large, unless some means is provided for increasing the torque, and it is for this reason that some method of changeable gear reduction is in almost universal use.

Briefly described, the electric drive equipment for motor buses includes a direct current generator which is connected to an internal combustion engine and which supplies current to direct current series motors of a type common to electric railways. Electric reversing and series parallel switches provide for directional movement and customary motor combinations. Variation in the speed and torque of the driving wheels is smoothly accomplished throughout the entire range by simply varying the voltage of the generator. There are approximately 800 of these equipments in successful operation in Philadelphia, Albany, Miami, Atlanta, Kansas City, Los Angeles and Portland (Ore.), and nearly 400 equipments are now being placed in operation by the Public Service Corporation of New Jersey.

The question might well be asked: Why use electric drive involving somewhat greater weight and cost? Some of the reasons are: Better schedule speeds in frequent stop service, less engine revolutions and lower peak engine speeds to cover a given mileage, less mechanical strain on the engine driving mechanism and on the tires, and, more important, a smoother acceleration bringing greater comfort for passengers and greater safety by reason of less manual duty on the part of the operator and better control of the bus.

Several factors contribute to the ability of the electric drive to maintain higher average bus speeds in frequent stop service. Of chief importance is the elimination of the time lost in shifting gears during each acceleration or on grades. With the automatic electric drive the characteristics of the generator and motor are such that the engine may be quickly increased in speed from idling to a point of high output speed, and then gradually increased to maximum safe output with no intermission or lag. The result is operation at the most efficient part of the speed curve, a more constant power output, and a very appreciably higher rate of acceleration. This higher rate of acceleration permits higher schedule speeds, and experience indicates that under similar operating conditions a bus equipped with electric drive can maintain at least 10 per cent higher schedule speed than a bus equipped with mechanical transmission. This gain in schedule speeds means that as the electric drive will produce more miles for an

hour of driver's time—a material reduction in one of the largest single factors of operating costs, that is, crew wages. But what is of equal, if not greater importance, it provides a more attractive ride to your customers, for the demand of today's transportation is speed and comfort, but above all, speed.

There is little question but that with expert drivers mechanical transmission can accelerate as rapidly as electric transmission, but it is not feasible in normal operation, and even though it were, it is probable that accidents would increase to such an extent that the pace could not be maintained.

In actual service tests with electric drive the maximum engine speeds obtained during acceleration or when climbing severe grades are approximately 1700 r.p.m. and normally in frequent stop service the maximum speed seldom exceeds 1500 r.p.m. Similar tests with mechanical drive when attempting to maintain similar schedules show maximum engine speeds of 2000 to 2600 r.p.m. in the intermediate gear position. Or, to put it another way, the electric drive reduces the engine peaks during acceleration approximately 40 per cent.

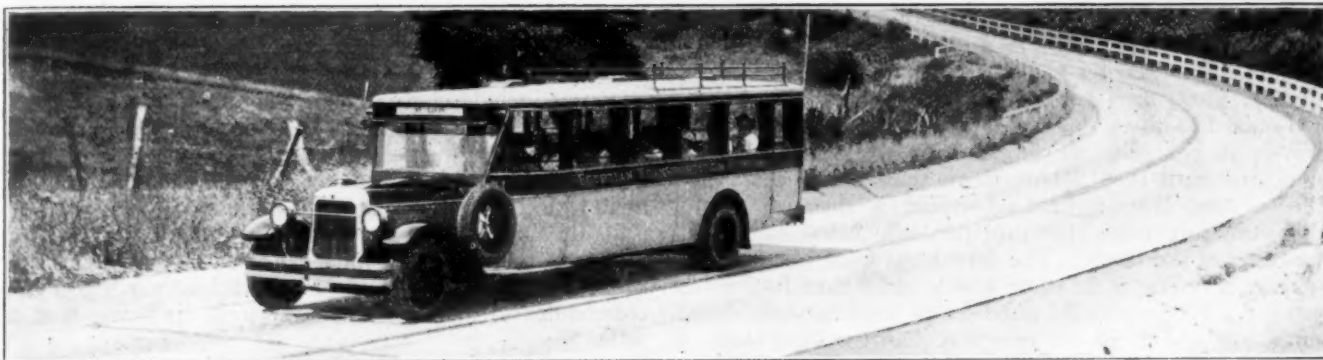
The torsional strain during acceleration on the engine, chassis, clutch and gears are recognized as contributing to high maintenance costs, and the surges of torque and changes in cylinder pressures due to too rapid clutch engagement are an important factor in causing knocking and cylinder cracking. The freedom of such torque surges in the electric transmission permits the use of higher engine compressions on advance spark and increases the power and efficiency.

The question which occurs to the average operator is: Do you sacrifice fuel efficiency by the use of electric drive. The overall efficiency of electric drive is approximately 75 per cent, which is less than mechanical transmission on direct gears and for this reason it would seem that the fuel efficiency should be less. Results in service show that electric drive does not increase the fuel consumption beyond that required by the additional weight of equipment. An 11-ton loaded bus equipped with mechanical transmission will operate from 4 to 4.5 miles per gallon of gasoline, or 44 to 50 ton-miles per gallon. The same vehicle equipped with electric drive will weigh approximately 12 tons loaded and will operate 3.5 to 4 miles per gallon of gasoline, or 42 to 48 ton-miles per gallon. This is far less increase than is caused by the use of a 6-cylinder engine instead of a 4-cylinder, yet 75 per cent of all buses are today being equipped with 6-cylinder machines.

As a matter of fact, any difference in fuel is relatively unimportant as fuel costs are about $4\frac{1}{2}$ cents per bus mile, and any factor which affects fuel consumption 10 per cent will effect costs less than one-half cent per bus mile. The most important item in costs is crew expenses and, as this item is approximately $14\frac{1}{2}$ cents per bus mile, any factor which affects the schedule speed by 10 per cent affects the costs $1\frac{1}{2}$ cents for crew wages only and, furthermore, affects the fixed charges in the same ratio because as schedule speed increases the number of buses for the same service decreases.

The period of operation is too short as yet to make available any figures on relative maintenance. However, the Philadelphia Rural Transit Company and the Capitol District Transportation Company have doubled their inspection periods with electric drive and so reduced their garage expense.

After all, the most important point is high schedule speed with smooth acceleration, greater comfort for passengers, quiet operation and greater safety by reason of less manual duty on the part of the operator and better control of the bus.



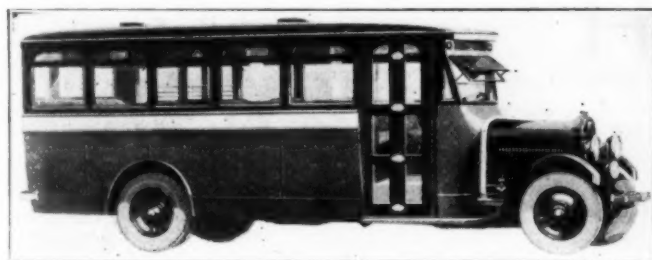
Large Buses of the Parlor Type Provide Limited Service Between Southern Illinois and St. Louis

Successful Operator Uses Both Large and Small Buses

*Egyptian Transportation System in southern Illinois
good example of well-planned bus line layout*

THE adaptation of the size of highway equipment to the job to be done has been carried out with marked success by a successful bus operating company in southern Illinois. This company, the Egyptian Transportation System, now has approximately 500 miles of bus lines, operating its 20 motor buses of various types over 122,000 miles a month.

Although known as an independent bus line, the Egyptian Transportation System is connected indirectly



Small Size, Intercity Type Bus Used in Local Service Where Traffic Is Light

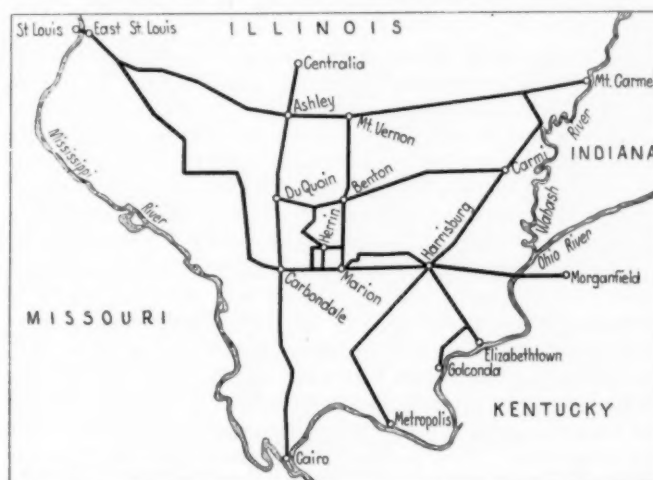
with a railway, since its president, H. E. Barber, is president also of the Marion & Eastern.

The Egyptian Transportation System serves the coal mining district of southern Illinois, operating local bus service between the mining towns and limited bus service between these towns and St. Louis, Mo. The present system is a development of over five years. A number of the routes have been added recently, the system having more than doubled in length in the last six months.

The system centers around Marion, Ill., where the headquarters of the company are located. The present timetable shows 10 separate operations. Of these, the one from St. Louis, Mo., to Harrisburg, Ill. is the longest. Next in length is that from St. Louis to Mt. Carmel, Ill. Other lines extend from Marion, Ill. to Herrin, Carbon-dale to Harrisburg, Harrisburg to Shawneetown, Carbon-dale to Centralia, Mt. Vernon to Nashville, Marion to Mt. Vernon, Benton to DuQuoin, and Johnston City to Carbon-dale.

For simplicity of operation and schedule-making the system is divided into a number of divisions, the larger towns being located at division points. The schedules of the buses on the several divisions are so arranged that connections are made between buses operating on connecting lines, thereby making possible a continuous trip over the entire system.

The frequency of service provided by the buses of the Egyptian Transportation System varies according to the needs of the communities served. For example, on the St. Louis-Harrisburg line over which limited service is provided, three round trips are made daily, buses leaving St. Louis for Harrisburg at 7:30 a. m., 3:30 p. m., and 7 p. m., and leaving Harrisburg for St. Louis at 6:20



The Bus Lines of the Egyptian Transportation System

a. m., 11:05 a. m., and 3:05 p. m. On the Marion-Herrin route, on the other hand, approximately hourly service is provided. On the other routes it varies from hourly service to service every three or four hours.

The schedule of fares charged is not uniform. Fares between competitive points average slightly in excess of

four cents a mile. On other routes, however, fares of as high as six and seven cents a mile are charged. Thus the fare from Marion to Mt. Vernon, a distance of 38 miles, is \$1.60 or 4.2 cents per mile. From Marion to St. Louis, 106 miles, the fare is \$4.30 or a little more than four cents per mile. From Marion to Harrisburg, 20 miles, the fare is \$1.50 or more than seven cents per mile. From Marion to Carbondale, a distance of 15 miles, the fare is \$1, the rate per mile being somewhat in excess of six cents. The fare from Centralia to Carbondale, 52 miles, is \$2.10 or a little more than four cents per mile. Mileage books, good for passage between stated points, are sold at 10 per cent less than the local rates.

The service provided by the Egyptian Transportation System is in many respects as complete as that of the railways. Baggage, within certain size limits, is carried free of charge. Stations are maintained at the principal towns, these stations providing rest rooms for passengers. Insurance against personal injury to passengers is provided by the company. It is notable, however, that the timetable of the company calls attention to the fact that in five years of operation the line has never had a serious injury to a passenger. The buses arriving at St. Louis are scheduled to make direct connection with the Illinois Traction System electric trains for points in northern Illinois. On the longer routes, on which buses are in transit during meal periods, stops are made for lunch.

Equipment

The road equipment of the Egyptian Transportation System consists of 12 small buses manufactured by Graham Brothers, four small inter-city type buses manufac-



Parlor Type Bus Used on the Limited, Long Distance Route

tured by the Reo Motor Car Company, and four type Y parlor coaches manufactured by the Yellow Truck & Coach Manufacturing Company. The parlor type coaches are concentrated on the long route from St. Louis to Harrisburg. These coaches are operated on a limited schedule, making no stops except at the principal towns.

The Graham Brothers and Reo buses, being of smaller capacity, are assigned to the routes where frequency of service rather than large capacity is the essential consideration. On the St. Louis-Harrisburg run, the comparatively infrequent operation makes larger capacity necessary. Hence the use of the larger parlor buses on this line. On the local runs, however, buses having from 14 to 20 passenger capacity have been found sufficient to take care of the business with the frequent departures provided for by the schedules. The smaller local buses operating on the short divisions pick up and discharge passengers along the highways and in the small towns and are patronized heavily, as are the parlor buses on the through routes. The operating statement of the system for December, 1925, shows the following operating expenses.

Operating Expenses	Total Cost	Cost per Mile
Maintenance of equipment.....	\$6,049.08	\$0.0494
Traffic	251.00	0.002
Transportation	7,335.70	0.0609
General	391.52	0.0032
Total operating expenses.....	\$14,037.30	\$0.1147

The maintenance of equipment account includes a charge of \$2,184.32 for depreciation. Under traffic expense is an item of \$251 for advertising. Transportation expenses include charge for superintendence, ages of bus drivers, gasoline, taxes, etc. General expenses include expenses of the general offices, the salaries of office clerks and county and federal taxes. The statement does not include a charge for salaries of general officers which apparently accounts in part for the exceptionally low operating cost of 11 cents per mile. The cost of gasoline of 1.1 cents per bus mile, which seems extraordinarily low, also contributes to the lowness of the total operating cost per mile.

Sources of Bus Traffic

An investigation made by the Egyptian Transportation System as to the sources from which its passengers were drawn led to the conclusion that the buses are not taking business from the railroad to any large extent. Instead they are being drawn back to the public carrier from the private motor car. The survey showed specifically that in a territory like that of southern Illinois, where the towns are close together and the population is fairly dense, a high frequency of service is demanded. The public will not wait for six or eight hours for a train and will resort to private automobiles and in many instances to taxicabs rather than wait so long. With the advent of high frequency bus service, however, the people in the territory served by the Egyptian Transportation System are using the buses rather than the private cars and taxicabs.

Western Society of Engineers Studies Motor Transport

HIGHWAYS and Motor Transportation was the subject considered by the Western Society of Engineers at its fifth annual convocation held at Chicago on April 21 and 22. The subjects and writers of the papers read were as follows: Highways in the United States, by Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads; Analysis of Highway Traffic, by Henry E. Riggs, consulting engineer and professor of civil engineering, University of Michigan; Motors in Conjunction with Rail Transportation, by F. J. Scarr, supervisor of motor service of the Pennsylvania; Regulation and Taxation of Motors as Common Carriers, by Dwight Lewis, chairman of the Board of Railroad Commissioners of Iowa; Highway Capacities, by Major R. F. Kelker, Jr., consulting engineer; Economics of Highway Transportation, by Henry R. Trumbower, economist in the Bureau of Public Roads, Washington, D. C.; Motor Bus Operation, by H. E. Barber, president of the Egyptian Transportation System; Financing Highway Construction and Maintenance, by Jacob Viner, professor of political economy at the University of Chicago; and Safety Considerations in Highway Design, by Sidney J. Williams, director of public safety of the National Safety Council.

THE ASSEMBLY of New York State has defeated the Truman bill which had previously passed the Senate amending the railroad law to provide that a railroad corporation upon obtaining the approval of the Public Service Commission and the consents of local authorities, might acquire, own and operate motor vehicles for hire for the purpose of carrying persons and property upon the highways of the state and receive compensation therefor.

Determining Where a Railroad Can Profitably Install Bus Service

What studies of traffic, comparative costs, routes, etc., are required and how to make them

By B. W. Ainsworth*

THERE are two methods of commencing bus operation—one is the more or less haphazard way of beginning without any clear conception of the details of the problem or the results which might be expected. This sometimes done and consists of merely taking off a train run and replacing it with a bus and then tackling each problem of baggage, train connections, or whatever it might be, as it arises. Occasionally this method works out in a satisfactory manner, but as errors are costly it is much safer to carry out a survey, both on the existing train situation and the proposed bus operation. In other words adopt the budget system and have something to shoot at.

A system of questionnaires will produce most of the information which is needed, and a careful study of this should be made before plunging into a costly operation which might not be satisfactory.

All the facts connected with the operation of each train affected should be obtained to see if it is possible to handle the traffic by bus. In some cases where there are passengers in excess of a bus load they can be handled by running a double-header—two buses leaving at approximately the same time.

If the proposed service consists merely of additional operations, the details of train operation are not required. A study must be made of train connections and through service only.

The Bus Survey

The following is a short résumé of the sort of survey required before a serious study can be made and a decision arrived at:

A careful analysis should be made of each train which it is proposed to replace with a bus. The information required is: The maximum and average number of passengers getting on and alighting at all intermediate stations; the amount of traffic emanating from a source remote from the route under consideration; the volume of commuter traffic and pass riders; and baggage, express, mail, milk, papers, etc. Unusual conditions, such as market days in small towns, and other factors affecting the average flow of traffic must be noted.

Train connections must be given careful consideration to be sure that the speeds obtainable enable the connections to be made without undue effort under adverse weather conditions. A point of great importance is to make sure of the elimination of a complete unit, engine, train and crew, and to ensure this, some departure from past practice is permissible if it does not impair the rest of the service.

The correlation of this information is a matter of considerable labor, but it enables a much better picture to be obtained, and a decision arrived at with a minimum of

uncertainty. The passenger and baggage records should be shown on separate sheets and entered under similar headings. If a record is taken over a number of days, as it should be, in order to obtain representative figures, it can be set up as follows:

RUN—TERMINAL TO TERMINAL												
Train Number 653 Weekdays												
1926 January	16th			17th			18th			19th		
	On	Off	Net	On	Off	Net	On	Off	Net	On	Off	Net
Terminal ...	40	..	40	34	..	34	25	..	25	20	..	20
	..	..	40	..	..	34	..	..	25	..	..	20
	..	..	40	..	..	34	..	..	25	..	..	20
	3	..	43	3	..	37	2	..	27	2	..	24
	..	..	43	2	..	39	..	..	27	..	..	24
Inter- mediate stations	2	..	45	2	..	41	..	..	27	1	..	23
	10	1	54	10	2	49	9	2	34	1	1	23
	1	1	54	3	5	47	5	2	37	5	2	26
	..	8	46	2	2	47	6	8	35	1	..	27
	1	1	46	..	..	47	..	1	34	..	..	27
	..	..	46	..	..	47	..	..	34	..	..	27
Terminal ...	..	46	..	..	47	..	..	34	..	..	27	47
												36
												36

Highway Should Be Surveyed

This tabulation will show the passengers or baggage on the train at any one station, as well as the maximum it is necessary to provide for.

Having arrived at a clear idea of the train it is desired to replace, a survey of the highway over which it will be necessary to operate a bus should be made. While not absolutely essential, it is of the greatest benefit to construct a map of the route showing all important points, population of towns passed through and the relationship of the highway to the railroad stations and tracks. Maps, moreover, are of great value in preparing evidence to present to public service commissions when application is being made for permission to operate buses. Due regard must be paid to road surfaces, gradients, turns, narrow bridges and bridges of doubtful capacity. The speed at which it is possible to operate a bus, so that a definite schedule can be maintained under all ordinary conditions and circumstances, must be determined.

From the information obtained it is then possible to set up a schedule, which may conform closely to the train schedule to be replaced or in some instances improved upon it.

A form of schedule which shows clearly existing train movements, proposed changes with bus operation and connections with main line trains is given in the table at the top of the following page.

Comparing Train and Bus Costs

It is of considerable assistance to build this time table up by means of a chart setting out distance vertically and time horizontally, the different runs being shown in different colors or dash and dot lines. Chart 1 herewith is a typical example. The method is one which is in general use and it is unnecessary to elaborate upon it.

If the estimated costs of bus operation are set up beside the corresponding costs for train operation a clear picture of the proposed undertaking will be obtained and the estimated profits for each route can be combined to give

*Mr. Ainsworth is an automotive engineer who has been engaged for years in the study of transportation problems. Lately he has, in the service of the International Motor Company, devoted particular attention to specific problems involved in motor bus operation by the railroads. This article, based on actual railroad experience, is published as being of interest to those roads contemplating bus operation.—EDITOR.

the results as a whole. With care these figures should be fairly representative of the actual results which can be obtained.

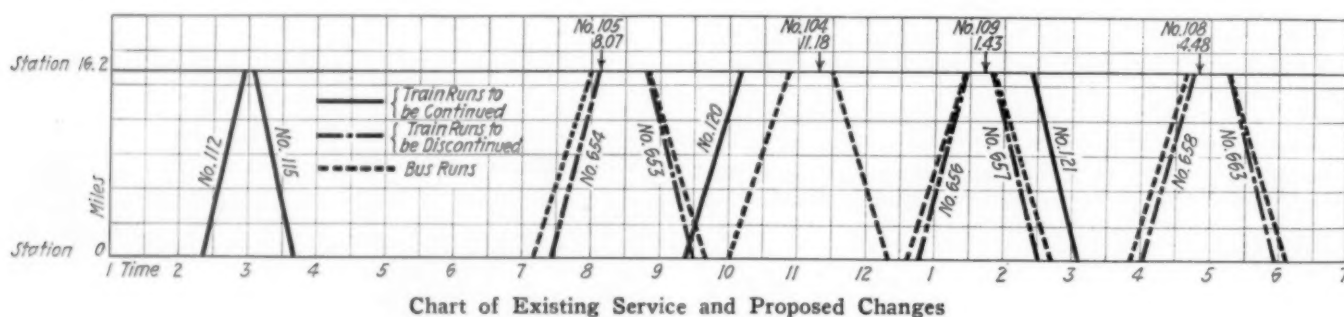
This is only a brief outline of the preliminary work,

TABLE SHOWING EXISTING SERVICE AND CHANGES PROPOSED

WEEKDAY											
Terminal—Leave				Northbound				Terminal—Arrive			
Main line train connection		Branch line train		Proposed service		Main line train connection		Branch line train		Proposed service	
No.	Time	No.	Time	No.	Time	No.	Time	No.	Time	No.	Time
112	2.21a	112	2.21a	112	2.21a	112	2.56a	112	2.56a	112	2.56a
654	7.25a	B*	7.10a	105	8.07a	654	8.05a	B	8.00a	654	8.00a
120	9.25a	120	9.25a	104	11.18a	120	10.10a	120	10.10a	120	10.10a
656	12.45p	B	10.00a	109	1.43p	656	1.25p	B	1.25p	656	1.25p
658	4.02p	B	12.35p	108	4.48p	658	4.45p	B	4.40p	658	4.40p
Terminal—Leave				Southbound				Terminal—Arrive			
Main line train connection		Branch line train		Proposed service		Main line train connection		Branch line train		Proposed service	
No.	Time	No.	Time	No.	Time	No.	Time	No.	Time	No.	Time
115	3.06a	115	3.06a	115	3.06a	115	3.40a	115	3.40a	115	3.40a
653	8.50a	B	8.50a	653	9.29a	653	9.29a	B	9.40a	653	9.40a
104	11.18a	B	11.30a	657	2.30p	104	11.18a	B	12.20p	104	11.18a
109	1.43p	657	1.50p	125	2.23p	109	1.43p	657	2.40p	109	1.43p
125	2.23p	125	2.23p	663	5.15p	125	3.03p	125	3.03p	125	3.03p
663	5.15p	B	5.15p	663	5.55p	663	5.55p	B	6.05p	663	5.55p

B—Refers to bus run.

but it indicates that a large amount of matter has to be sifted and analyzed if the operation is to be started with any degree of certainty regarding the final results. The



expense and time involved will be well repaid by the knowledge of the outcome, and the figures and other particulars are of great value for reference purposes and also in preparing documents to the preliminary work of the operation.

Type of Bus Important

The type of bus to operate, the number of passengers to be carried, and the kind of bus body is a matter requiring careful consideration, and in the latter respect is greatly affected by the operation and class of passenger traffic handled. The keynote of the whole thing is reliability. The public will quickly become disgusted with a service on which it cannot rely. Missed trains cause more dissatisfaction than the inability to get any means of transportation at all. This applies with greater force to railroad operation of buses than to any other kind of service. The first cost is not a vital factor, but the effect on the public and the cost of upkeep are of paramount importance.

Practical utility should govern the interior arrangements, and the use of a large number of useless accessories and fittings is to be deplored.

Bus Surveys

A typical survey consists of the following documents:

1. Actual operating schedule of trains with proposed operating schedule of buses.
2. Charts supporting the foregoing data.
3. Particulars of all traffic on passenger trains to be eliminated.

4. Description of the highway route involved in the run.

5. Special or commutation tickets, and other information pertinent to "3."

6. Particulars relating to any other existing or contemplated service which might be affected by the proposed operation.

7. Analysis of the costs of operation on trains expected to be eliminated.

8. Estimated costs of bus operation on the routes surveyed.

9. Set up of comparative figures of bus and rail operating costs.

10. Deductions from the foregoing data on which the final conclusions are based.

The fares to be charged are affected by the local facts to some extent and this is a subject requiring consideration by itself, but, generally speaking, the basis of the bus fares should be the same as for the railroad, as this makes a simpler method of accounting and renders the use of through tickets easy, and also makes possible the use of a ticket available either on the trains or on the buses.

The acceptance of commutation and free passes on buses will have a considerable effect on the revenue and is a matter which should receive special consideration. There are several other types of "frequent ride" tickets

which may be used on buses which are attractive without being unprofitable.

Preparing the Case for the Public Service Commission

Before matters have proceeded as far as a hearing before a public service commission, the criticism which is likely to be engendered by the application should receive the closest attention. In some instances compromises can be effected, and in others, such as an opposing small, independent bus operator, a purchase can be made. Wherever the opposition can be removed either by compromise or purchase or some other arrangement this course should be adopted before the case comes up for hearing. The less extraneous matter which has to be discussed and the less time absorbed presenting evidence and in postponements, useless in many cases, the more likelihood of the case itself being decided solely on its merits. In all probability the same course will have to be taken after the hearing as should have been taken prior to it, but with a marked difference in the results.

The bus operating organization should be separate, following the practice of several companies now operating which are the off-shoots of railroads. The personnel chosen to handle the buses must in the first case have experience in the automotive field.

Inasmuch as the buses have to run in co-ordination and co-operation with the railroad, however, a railroad man should be chosen to occupy a position of responsibility in the bus organization, it being very difficult for men unacquainted with railroads to break into their methods and get the confidence which is vital to establish efficiency.

General News Department

The Canadian Railway Club will hold its annual meeting at the Hotel Windsor, Montreal, on May 11. New officers will be elected.

The Cincinnati, New Orleans & Texas Pacific has asked the Interstate Commerce Commission for an extension of time to August 1 in which to complete the installations of automatic train control being made under the commission's two orders. The first installation is in operation and is completed except for some of the locomotives. On the second installation 170 of the 177 miles of road have been equipped and 40 of the 63 locomotives, while automatic signal changes have been completed on 132 miles.

An investigation by a select committee of the House of Representatives is proposed by Representative McLaughlin, of Nebraska, in a resolution introduced in the House on April 15, into "the administration and enforcement of standards of railway equipment and supplies prescribed by law or by the Interstate Commerce Commission . . . including the approval by the commission or its agents of such equipment and supplies." The committee would also be directed to determine in so far as it may "whether such transactions and approval have been proper and lawful in all cases."

Investigation of Western Maryland Strike Proposed

A resolution calling for an investigation of the strike of the engineers and firemen on the Western Maryland, which has been in progress since last October, was introduced in the Senate on April 20 by Senator Shipstead of Minnesota and referred to the committee on interstate commerce. The resolution, which was introduced after a long speech on the strike, asks an investigation of the conditions which caused the strike, the failure of the efforts at a settlement, and "Mr. John D. Rockefeller's attitude to them."

A. R. A. Safety Program for June

L. G. Bentley, chairman of the committee on publicity of the Safety Section of the American Railway Association has issued circular No. 119, giving the schedule of safety activities for the month of June, as prescribed at the annual meeting; the two subjects for this month being (1) accidents due to bumping against cars which have been placed for unloading and (2) stepping or tripping on stones, boards, etc. A study of the records shows that men on repair tracks are the most common victims of carelessness under topic No. 1. Consignees and others who are in freight cars, are not properly notified by the men moving the cars. The committee thinks that a great deal of additional work should be done in connection with these two causes.

Engines Run From Houston to El Paso

The Southern Pacific is now running passenger trains between El Paso, Tex., and Houston, a distance of 832 miles, without changing locomotives, and thus exceeding slightly the longest runs previously made on the same road between El Paso and Los Angeles, Cal., 815 miles. The Houston-El Paso run was established on April 4 when the runs of trains Nos. 7 and 8 were extended and the change of engines at Del Rio, the former intermediate terminal was discontinued. The Argonaut, a New Orleans-San Francisco train, was established on the same date, thereby making possible the long runs. Five Class C5 engines are used in the new long runs, with four in constant use and one in reserve. The saving in engines is indicated by the fact that only a few years ago five engines were used to draw a single train from Houston to El Paso, the divisions being from Houston to San Antonio, to Del Rio, to Sanderson, to Valentine, to El Paso. Thus it took 20 engines to handle the four trains making that route daily. This work is now accomplished by five engines.

I. C. C. Valuation Progress

A total of 756 tentative valuation reports, covering 1,104 properties and 141,263 miles, or 57.7 per cent of the total railway mileage under valuation, had been completed and served on the carriers up to March 31, according to a progress report submitted to the commission by the Bureau of Valuation. The reports completed by the analysts and the accounting, land and engineering sections of the bureau up to March 31 numbered 869, covering 1,285 properties, and 158,329 miles, or 64.7 per cent of the total, but some of them had not yet been passed on by the tentative valuation committee or sent to Division 1 of the commission for approval, while 830 reports had been completed by the tentative valuation committee. During the month of March 30 tentative valuation reports were sent to Division 1 for approval while 18 were approved by the division and 22 reports were served on the carriers.

As compared with the statement of progress given in the commission's annual report, as of October 31, 1925, the latest report shows an increase of 99 reports served. On that date 657 reports had been served, covering 51.46 per cent of the mileage. As compared with October 31, 1924, the March 31 report shows an increase of 370 reports.

The preliminary underlying reports of the accounting, land and engineering sections of the bureau have for some time been completed on practically all of the steam railroads of the United States. The accounting section has completed 1,085 reports, covering 244,296 miles; the land section 1,114 reports, covering 234,749 miles, and the engineering section 1,052 reports, covering 243,353 miles, and these have all been served on the carriers.

Superintendents Consider Rough Handling

Over 1,500 yard and terminal employees of St. Louis and East St. Louis attended two night meetings arranged by the Superintendents' Association of St. Louis and that of the East St. Louis terminal district on April 13 and 14 to discuss the rough handling of freight. F. E. Hatch, terminal superintendent of the Illinois Central, presided. The East St. Louis meeting was addressed by G. L. Candler, assistant general manager of the Central of Georgia, who is chairman of the southwestern lines' committee on the elimination of rough handling. The St. Louis meeting was addressed by H. T. Lively, general claim agent of the Louisville & Nashville, who is chairman of the rough handling committee of the Central Claim Conference.

On April 14 visitors were taken by special train over the East St. Louis terminals, visiting the various classification yards, including the new hump yard of the Illinois Central where a demonstration of the various operations of the hump yard, including the car retarder system, was given. The Terminal Railroad Company's Madison yard and the Missouri Pacific's Dupon (Ill.) yard were also visited. Motion pictures were exhibited at the night meetings by representatives of the Illinois Central and the Norfolk & Western.

Mr. Candler, in the course of his talk, said that he would like to see superintendents' associations in every terminal in the country for more than one-fourth of the money paid in loss and damage was chargeable to rough handling. Although the loss and damage account has been reduced, the ratio chargeable to rough handling remains practically the same. Although the railroads saved more than \$80,000,000 in preventing damage during the past five years, it is now necessary to concentrate on rough handling, where a great deal more money can be saved. Co-ordination and co-operation are all that are necessary in dealing with a transportation problem of this character. Damage to freight is solely a transportation responsibility, and that department will have to assume it.

He qualified his remarks with a doubt whether the railroads tolerate rough handling to the extent that is charged. He did not feel that it has been entirely fair to charge yard men with

rough handling without at the same time looking into the question of whether sufficient time was allowed them for the make-up and break-up of trains. He estimated that the cost of repairs to cars damaged by improper handling is 16 times greater than the cost of damage to the contents of such cars.

He called upon the claim agents who were present not to be satisfied with the issuance of monthly reports, but to keep the transportation offices advised by letter over their personal signature as to the problems met by the claim agents in their investigation of damage, and to do this especially in connection with rough handling. He urged agents to see that their men exercised more care in making exception reports, in order that it may be possible to determine from the nature of the damage what may have been the cause. In addition, he impressed upon yard men the impor-

tance of avoiding excessive speed in switching, saying that the necessity for this is largely imaginary. Making speed in order to save time often causes a considerable loss of time later.

Western Club Discusses Freight Claims

The meeting of the Western Railway Club on April 19 was given over to the Freight Claim Division of the American Railway Association. The work of the division was described by its members with the aid of moving pictures. C. H. Dietrich, chairman of the Freight Claim Division, and freight claim agent of the Chicago, Milwaukee & St. Paul, outlined claim work and described the methods of settling and pro-rating claims. W. F. Thiehoff, president of the Western Railway Club, and general manager of

OPERATING REVENUES AND OPERATING EXPENSES OF CLASS I STEAM ROADS IN THE UNITED STATES

(FOR 188 STEAM ROADS, INCLUDING 13 SWITCHING AND TERMINAL COMPANIES)

FOR THE MONTH OF FEBRUARY, 1926 AND 1925

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925
Average number of miles operated	237,026.37	236,824.28	59,363.14	59,560.34	5,537.34	5,531.88	38,699.75	38,505.47	133,426.14	133,226.59
Revenues:										
Freight	\$340,276,009	\$336,946,331	\$149,983,829	\$152,548,843	\$17,982,313	\$16,265,337	\$53,140,872	\$48,811,699	\$120,068,995	\$119,320,452
Passenger	78,594,542	77,598,979	37,283,492	36,673,968	1,696,255	1,777,931	14,045,143	13,131,681	25,569,652	26,915,399
Mail	7,583,917	7,682,391	2,788,388	2,890,229	209,891	214,539	1,152,783	1,106,749	3,432,855	3,470,874
Express	9,129,797	9,236,544	4,144,695	3,908,014	208,981	178,886	1,428,038	1,568,283	3,348,083	3,581,361
All other transportation ..	14,775,560	14,497,229	8,246,531	8,283,577	178,142	169,575	910,092	919,248	5,440,795	5,124,829
Incidental	9,157,165	8,623,190	4,553,778	4,270,546	361,218	289,671	1,475,225	1,288,107	2,766,944	2,774,866
Joint facility—Cr.	1,066,789	797,906	452,325	347,300	18,072	15,915	136,393	125,641	459,999	309,050
Joint facility—Dr.	379,542	197,084	133,536	93,553	1,856	1,702	33,774	36,315	210,376	65,514
Ry. operating revenues ..	460,204,237	455,185,486	206,419,502	208,828,924	20,653,016	18,910,152	72,254,772	66,915,093	160,876,947	160,531,317
Expenses:										
Maintenance of way and structures	58,872,162	55,011,942	25,661,785	23,792,387	2,719,222	2,763,508	9,658,032	8,682,708	20,833,123	19,773,339
Maintenance of equipment ..	100,851,424	101,513,614	48,180,861	49,305,167	4,744,994	4,308,674	13,268,615	12,316,301	34,656,954	35,583,472
Traffic	8,900,764	8,241,440	3,230,647	3,056,408	234,183	221,714	1,717,101	1,583,206	3,718,833	3,380,112
Transportation	173,649,224	173,749,658	82,956,048	83,064,402	5,896,989	5,668,301	25,414,063	23,573,799	59,382,124	61,443,156
Miscellaneous operations ..	4,312,965	4,053,084	2,031,816	1,878,155	96,239	92,130	659,940	619,146	1,524,980	1,463,653
General	14,785,807	13,918,263	6,864,806	6,205,520	438,619	448,437	1,928,394	1,791,124	5,553,988	5,473,182
Transportation for investment—Cr.	781,950	802,172	66,656	140,597	12,198	22,504	148,403	139,740	554,693	499,331
Ry. operating expenses ..	360,590,396	355,685,829	168,859,307	167,161,442	14,118,048	13,480,260	52,497,732	48,426,544	125,115,309	126,617,583
Net revenue from railway operations	99,613,841	99,499,657	37,560,195	41,667,482	6,534,968	5,429,892	19,757,040	18,488,549	35,761,638	33,913,734
Railway tax accruals	28,209,922	26,867,912	10,344,818	10,006,282	1,524,030	1,214,831	4,219,260	3,922,127	12,031,814	11,724,672
Uncollectible ry. revenues ..	126,414	126,249	72,025	38,854	5,162	14,776	10,943	17,069	38,284	55,550
Ry. operating income ..	71,277,505	72,505,496	27,053,352	31,622,346	5,005,776	4,200,285	15,526,837	14,549,353	23,691,540	22,133,512
Equipment rents—Dr. bal.	6,103,003	5,821,915	3,281,665	3,141,925	638,261	539,715	1,836,116	985,879	1,623,483	2,213,826
Joint facility rent—Dr. bal.	1,885,205	1,532,529	731,819	655,148	115,596	107,450	102,356	41,820	935,434	728,111
Net ry. operating income ..	63,289,297	65,151,052	23,039,868	27,825,273	5,528,441	4,632,550	13,588,365	13,521,654	21,132,623	19,171,575
Ratio of expenses to revenue (per cent)	78.35	78.14	81.80	80.05	68.36	71.29	72.66	72.37	77.77	78.87

FOR TWO MONTHS ENDED WITH FEBRUARY, 1926 AND 1925

Average number of miles operated	236,999.91	236,801.45	59,363.73	59,561.28	5,536.46	5,531.88	38,699.75	38,490.52	133,399.97	133,217.77
Revenues:										
Freight	\$687,844,105	\$687,711,833	\$299,116,297	\$307,039,483	\$37,107,482	\$33,639,048	\$105,724,628	\$97,434,376	\$245,895,698	\$249,598,926
Passenger	168,099,286	166,338,008	79,553,108	79,146,599	3,666,728	3,793,356	30,261,392	27,395,756	54,618,058	56,002,297
Mail	15,597,261	15,793,523	5,764,876	5,989,291	426,422	431,670	2,365,607	2,271,985	7,040,356	7,100,577
Express	18,940,364	20,009,548	8,686,602	9,020,588	426,858	475,405	2,961,111	3,045,098	6,865,793	7,468,457
All other transportation ..	30,223,013	30,347,888	16,955,070	17,116,264	364,921	350,586	1,869,152	1,822,450	11,033,870	11,058,558
Incidental	19,130,522	18,629,587	9,556,545	9,283,015	713,713	625,219	3,010,933	2,671,234	5,849,331	6,050,119
Joint facility—Cr.	2,148,607	1,792,395	876,076	834,796	31,558	31,132	278,951	250,155	961,922	676,312
Joint facility—Dr.	783,463	418,617	270,905	201,076	3,960	3,660	68,020	66,111	440,569	147,770
Ry. operating revenues ..	941,199,695	940,204,165	420,237,669	428,228,960	42,733,822	39,342,756	146,403,745	134,824,943	331,824,459	337,807,506
Expenses:										
Maintenance of way and structures	117,655,252	111,979,393	51,244,936	49,172,873	5,557,924	5,298,645	19,428,518	17,798,991	41,423,874	39,708,884
Maintenance of equipment ..	206,294,289	209,971,525	98,385,263	101,672,619	9,559,222	9,245,628	27,223,408	25,946,061	71,125,696	73,107,217
Traffic	17,912,986	16,742,352	6,499,262	6,163,116	474,836	444,426	3,435,616	3,130,856	7,503,272	7,003,954
Transportation	360,392,122	365,635,851	170,122,741	172,788,847	12,479,265	11,963,568	52,552,419	48,868,313	125,237,697	132,015,123
Miscellaneous operations ..	8,888,035	8,406,486	4,165,456	4,042,625	193,391	179,539	1,351,056	1,167,874	3,178,132	3,016,448
General	29,949,828	28,364,299	13,780,325	12,627,699	907,438	920,273	3,879,012	3,652,706	11,383,053	11,163,621
Transportation for investment—Cr.	1,853,402	1,452,098	232,712	235,956	45,197	43,487	430,612	282,195	1,144,881	890,460
Ry. operating expenses ..	739,239,110	739,647,808	343,965,971	346,231,823	29,126,879	28,008,592	107,439,417	100,282,606	258,706,843	265,124,787
Net revenue from railway operations	201,960,585	200,556,357	76,271,698	81,997,137	13,606,943	11,334,164	38,964,328	34,542,337	73,117,616	72,682,719
Railway tax accruals	56,734,469	54,074,967	21,308,808	20,524,090	3,043,376	2,448,845	8,597,200	7,667,144	23,785,085	23,434,888
Uncollectible ry. revenues ..	237,119	271,193	122,650	116,254	8,155	18,412	21,960	30,870	84,354	105,657
Ry. operating income ..	144,988,997	146,210,197	54,840,240	61,356,793	10,555,412	8,866,907	30,345,168	26,844,323	49,248,177	49,142,174
Equipment rents—Dr. bal.	12,064,594	11,795,978	6,077,371	6,150,613	1,210,849	1,057,042	3,681,574	1,681,615	3,516,498	5,020,792
Joint facility rent—Dr. bal.	3,910,546	3,202,990	1,545,719	1,385,176	220,936	200,677	206,179	189,432	1,937,712	1,427,705
Net ry. operating income ..	129,013,857	131,211,229	47,217,150	53,821,004	11,545,325	9,723,272	26,457,415	24,973,276	43,793,967	42,693,677
Ratio of expenses to revenue (per cent)	78.54	78.67	81.85	80.85	68.16	71.19	73.39	74.38	77.96	78.48

a Includes \$3,051,623 sleeping and parlor car surcharge. b Includes \$2,729,509 sleeping and parlor car surcharge. c Includes \$6,445,842 sleeping and parlor car surcharge. d Deficit or other reverse items. e Includes \$5,707,949 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

the Chicago, Burlington & Quincy, commended the division and all men associated with claim work on the results that had been obtained during the past year. W. H. Embree, chief veterinary of the Western Weighing and Inspection Bureau, spoke upon claims due to loss of livestock and accompanied his address with stereopticon pictures. He said that 65 per cent of hogs lost in transportation died from heart and lung disease acquired during the fattening process. In 1925, he said, only one of every 850 hogs shipped died in transit, while in 1919 the ratio was one to 586. The losses in the shipment of cattle are small, due to the fact that this animal is in a healthy condition when shipped.

Capitalization and Income

The Interstate Commerce Commission has issued for 1925 the second issue of a compilation of special reports containing selected items of railway capitalization and income prepared for the purpose of furnishing figures of certain income and balance sheet items frequently called for and not appearing in the monthly reports of revenues and expenses.

The total capitalization of the Class I railways, operating 236,357 miles, excluding switching and terminal companies, according to the statement, was \$18,636,747,793 for 1925, of which \$7,672,161,993, or 41.2 per cent, was in stock, and \$10,964,585,800, or 58.2 per cent, was in long-term debt. Total operating revenues for the year amounted to \$6,120,614,094, of which \$4,534,706,029, or 74.1 per cent was paid out in operating expenses, including 33.9 per cent for maintenance. And 5.9 per cent was paid for taxes, leaving 20 per cent of the total for railway operating income, \$1,225,527,816. The debit balance of equipment and joint facility rents, \$103,846,657, left a net railway operating income of \$1,121,681,159, or 18.3 per cent of the operating revenues and other income of \$260,788,144 made the total income \$1,382,469,303.

From the total income there was deducted \$152,343,927 for rent for leased roads, \$488,472,929 for interest on funded debt, \$11,052,077 for interest on unfunded debt, and \$27,867,640 for "other deductions," making total deductions of \$679,736,573, and a net income of \$702,732,730. Dividend appropriations of income and surplus amounted to \$342,768,742. Total appropriations of income amounted to \$224,968,910, leaving an income balance transferred to profit and loss of \$477,763,820.

The commission's statement, No. 2660, available at the Government Printing Office also gives similar information for the roads individually and by districts.

Fuel Association To Hold Convention May 11

The International Railway Fuel Association has announced its program for the eighteenth annual convention to be held at the Hotel Sherman, Chicago, May 11 to 14. C. H. Markham, president, Illinois Central, and M. L. Gould, president, National Coal Association, are scheduled for addresses at the first session on Tuesday morning, May 11. The feature of the afternoon session will be an address on Operating Factors in Fuel Conservation, by W. R. Scott, president, Southern Pacific Lines. The program for the second day includes an address on Accounting Factors in Fuel Conservation, by J. J. Ekin, comptroller, Baltimore & Ohio; an address on the Engineering Factors in Fuel Conservation, by H. R. Safford, vice-president, Missouri Pacific System, and an address by R. J. Elliott, purchasing agent, Northern Pacific. C. E. Brooks, chief of motive power, Canadian National Railways, is scheduled to make an address Thursday morning, May 13, on the Mechanical Factors in Fuel Economy. The program follows:

TUESDAY, MAY 11 (OPERATING DAY)

- 9:30 a.m. (Daylight saving time).—Addresses by J. W. Dodge, superintendent fuel conservation; Illinois Central, C. H. Markham, president; Illinois Central, and M. L. Gould, president, National Coal Association.
- 11:30 a.m.—Co-operation with American Railway Association—Committee report.
- 12:00 m.—Report of secretary-treasurer.
- 12:10 p.m.—Appointment of Auditing and other committees.
- 12:20 p.m.—Unfinished business.
- 12:30 p.m.—New business.
- 12:45 p.m.—Adjournment.
- 2:00 p.m.—Address on Operating Factors in Fuel Conservation, by W. R. Scott, president, Southern Pacific Lines.
- 2:30 p.m.—Open forum—Operating factors and fuel economy:
 - (a) Coal.
 - (b) Oil.
 - (c) Electric—H. S. Peck, supervisor, locomotive and power plant operation, C. M. & St. P.
- 4:00 p.m.—Report of Committee on Divisional Fuel Meetings.
- 5:00 p.m.—Adjournment.

WEDNESDAY, MAY 12 (ACCOUNTING, ENGINEERING AND PURCHASING DAY)

- 9:00 a.m.—Report of Committee on Fuel Accounting, Distribution and Statistics.

- 10:00 a.m.—Address on Accounting Factors in Fuel Conservation, by J. J. Ekin, comptroller, B. & O.
- 10:30 a.m.—Report of Committee on Fuel Stations.
- 11:30 a.m.—Address on Engineering Factors in Fuel Conservation, by H. R. Safford, vice-president, Missouri Pacific System.
- 12:00 m.—Open forum—Engineering factors in fuel conservation:
 - (a) Oil.
 - (b) Coal.
 - (c) Electricity—E. T. Howson, western editor, *Railway Age*.
- 12:30 p.m.—Adjournment.
- 2:00 p.m.—Report of Committee on Stationary Plants.
- 3:00 p.m.—Address by R. J. Elliott, purchasing agent, Northern Pacific.
- 3:30 p.m.—Report of Committee on Storage of Coal and Fuel Oil.
- 4:15 p.m.—Report of Committee on Inspection, Preparation and Analysis of Fuel.
- 5:00 p.m.—Open forum.
- 5:30 p.m.—Adjournment.

THURSDAY, MAY 13 (MECHANICAL DAY)

- 9:00 a.m.—Report of Committee on Diesel Locomotives.
 - 10:15 a.m.—Address on Mechanical Factors in Fuel Economy, by C. E. Brooks, chief of motive power, Canadian National Railways.
 - 10:45 a.m.—Report of Committee on New Locomotive Economy Devices.
 - (a) Coal.
 - (b) Oil.
 Includes discussion of 1925 paper on Back Pressure as an Index to Fuel Economy, by R. W. Retterer, mechanical engineer, C. C. C. & St. L.
 - 12:45 p.m.—Adjournment.
 - 2:00 p.m.—Report of Committee on Firing Practice.
 - (a) Coal.
 - (b) Oil.
 - 4:00 p.m.—Open forum—Locomotive operation and fuel economy.
 - 5:25 p.m.—Adjournment.
- #### FRIDAY, MAY 14
- 9:00 a.m.—Report of Committee on Front Ends, Grates and Ash Pans.
 - 10:30 a.m.—Report of Committee on Constitution and By-Laws.
 - 10:45 a.m.—Reports of Committee on Auditing, Committee on Thanks, and other special committees.
 - 10:55 a.m.—Election of officers.
 - 11:55 a.m.—Balloting for place of 1927 convention.
 - 12:00 m.—Convention adjournment.

Exhibitors at June Conventions

The following list gives the names of firms which have thus far been allotted space by the Railway Supply Manufacturers' Association for the exhibits which will be held in Atlantic City simultaneously with the conventions of Division V, Mechanical, and Division VI, Purchases and Stores, of the American Railway Association and the summer meeting of the Association of Railway Electrical Engineers:

List of Exhibitors, Atlantic City Convention, June 9th-16th, 1926.

- Adams & Westlake Co., Chicago.
- Air Reduction Sales Company, New York.
- Allegheny Steel Company, Brackenridge, Pa.
- American Abrasive Metals Company, New York.
- American Arch Company, Inc., New York.
- American Brake Shoe & Foundry Co., Mahwah, N. J.
- American Brown Boveri Electric Corp., Camden, N. J.
- American Car & Foundry Co., New York.
- American Engineering Company, Philadelphia.
- American Hoist & Derrick Co., St. Paul.
- American Locomotive Company, New York.
- American Malleable Castings Association, Cleveland.
- American Railway Appliances Company, Inc., New York.
- American Steel Foundries, Chicago.
- American Tool Works Company, Cincinnati.
- Ames Shovel & Tool Co., Boston.
- Anchor Packing Company, Philadelphia.
- Anchor Post Iron Works, New York.
- Andrix Lock Nut Company, Inc., Adrian, Mich.
- Ashton Valve Company, Cambridge, Mass.
- Association of Manufacturers of Chilled Car Wheels, Chicago.
- Atkins & Co., E. C., Indianapolis.
- Atlas Steel Corporation, Dunkirk, N. Y.
- Automatic Transportation Company, Inc., Buffalo.
- Badeker Manufacturing Company, Chicago.
- Baker-Raulang Company, Cleveland.
- B. & S. Manufacturing Corporation, Hoboken, N. J.
- Baldwin Locomotive Works, Philadelphia.
- Barco Manufacturing Company, Chicago.
- Bassick Manufacturing Company, Chicago.
- Bath & Co., John, Inc., Worcester, Mass.
- Besly & Co., Charles H., Chicago.
- Bethlehem Steel Company, Inc., Bethlehem, Pa.
- Bettendorf Company, Bettendorf, Iowa.
- Bird-Archer Company, New York.
- Black & Decker Manufacturing Co., Towson, Md.
- Blacker Engineering Company, Inc., New York.
- Bowser & Co., Inc., S. F., Fort Wayne, Ind.
- Bradford Corporation, New York.
- Bradley Washfountain Company, Milwaukee, Wis.
- Brewster, Morris B., Inc., Chicago.
- Brill Company, J. G., Philadelphia.
- Brown-Lipe Gear Company, Syracuse, N. Y.
- Brubaker & Brothers Co., W. L., New York.
- Buckeye Portable Tool Company, Dayton, Ohio.
- Buckeye Steel Castings Company, Columbus, Ohio.
- Buffalo Brake Beam Company, New York.
- Buffalo Forge Company, Buffalo.
- Bullard Machine Tool Company, Bridgeport, Conn.
- Burden Iron Company, Troy, N. Y.
- Byers Company, A. M., Pittsburgh.
- Camden Forge Company, Camden, N. J.
- Camel Company, Chicago.
- Carbo-Oxygen Company, Pittsburgh.
- Carlton Machine Tool Company, Cincinnati, Ohio.
- Carnegie Steel Company, Pittsburgh.
- Carr Fastener Company, Cambridge, Mass.

- Celotex Company, Chicago.
 Central Steel Company, Massillon, Ohio.
 Centrifex Corporation, Cleveland.
 Chase & Co., L. C., Boston.
 Chaton Fibre Company, Boston.
 Chicago-Cleveland Car Roofing Company, Chicago.
 Chicago Pneumatic Tool Company, New York.
 Chicago Railway Equipment Company, Chicago.
 Cisco Machine Tool Company, Cincinnati, Ohio.
 Clark Car Company, Pittsburgh.
 Clark Manufacturing Company, Philadelphia.
 Cleveland Pneumatic Tool Company, Cleveland.
 Cleveland Twist Drill Company, Cleveland.
 Coffin, Jr., Company, J. S., Jersey City, N. J.
 Commonwealth Steel Company, St. Louis.
 Consolidated Machine Tool Corp. of America, Rochester, N. Y.
 Crane Company, Chicago.
 Crowe Manufacturing Corporation, Cincinnati, Ohio.
 Curtain Supply Company, Elkhart, Ind.
 Davis Brake Beam Company, Johnstown, Pa.
 Dayton Pneumatic Tool Company, Dayton, Ohio.
 Dearborn Chemical Company, Chicago.
 De Laval Separator Company, New York.
 Detroit Lubricator Company, Detroit.
 Detroit Seamless Steel Tubes Company, Detroit.
 Diamond Machine Company, Providence, R. I.
 Diston & Sons, Inc., Henry, Philadelphia.
 Distance-Speed Recording Company, New York.
 Dixon Crucible Company, Joseph, Jersey City, N. J.
 Dressel Railway Lamp & Signal Co., Arlington, N. J.
 Dromgold & Glenn, Chicago.
 Duff Manufacturing Company, Pittsburgh.
 Dunn Company, W. C., Cincinnati, Ohio.
 du Pont de Nemours & Co., E. I., Inc., Parlin, N. J.
 Edgewater Steel Company, Pittsburgh.
 Edison Storage Battery Company, Orange, N. J.
 Edna Brass Manufacturing Company, Cincinnati, Ohio.
 Edson Manufacturing Corporation, Boston.
 Edwards Company, O. M., Inc., Syracuse, N. Y.
 Electric Arc Cutting & Welding Co., Newark, N. J.
 Electric Products Company, Cleveland.
 Electric Service Supplies Company, Philadelphia.
 Elwell-Parker Electric Company, New York.
 Emery, E., Pittsburgh.
 Enterprise Railway Equipment Company, Chicago.
 Equipment Specialties Company, Chicago.
 Estate Stove Company, Hamilton, Ohio.
 Everlasting Valve Company, Jersey City, N. J.
 Ewald Iron Company, Louisville, Ky.
 Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio.
 Flannery Bolt Company, Pittsburgh.
 Ford Company, J. B., Wyandotte, Mich.
 Fort Pitt Malleable Iron Company, Pittsburgh.
 Franklin Railway Supply Company, New York.
 Frost Railway Supply Company, Detroit.
 Gairing Tool Company, Detroit.
 Galena-Signal Oil Company, New York.
 Garlock Packing Company, Palmyra, N. Y.
 General American Car Company, Chicago.
 General Electric Company, Schenectady, N. Y.
 Gerrard Wire Tying Machines Company, Chicago.
 Giessel Company, Henry, Chicago.
 Gill Railway Supply Company, Peoria, Ill.
 Gisholt Machine Company, Madison, Wis.
 Globe Railway Equipment Company, St. Louis.
 Goddard & Goddard Company, Inc., Detroit.
 Gold Car Heating & Lighting Co., Brooklyn, N. Y.
 Goodall Rubber Company, Philadelphia.
 Goodrich Rubber Company, B. F., Akron, Ohio.
 Goodyear Tire & Rubber Company, Inc., Akron, Ohio.
 Gould & Eberhardt, Newark (Irvington), N. J.
 Gould Coupler Company, Rochester, N. Y.
 Graham-White Sander Corporation, Roanoke, Va.
 Gray Company, G. A., Cincinnati, Ohio.
 Griffin Wheel Company, Chicago.
 Grip Nut Company, Chicago.
 Hale-Kilburn Company, Philadelphia.
 Hall Draft Gear Corporation, Watervliet, N. Y.
 Hanna Engineering Works, Chicago.
 Hanna Stoker Company, Cincinnati, Ohio.
 Hauck Manufacturing Company, Brooklyn, N. Y.
 Heald Machine Company, Worcester, Mass.
 Heywood-Wakefield Company, Wakefield, Mass.
 Housley Flue Connection Corporation, Indianapolis.
 Hubbard Steel Foundry Company, East Chicago, Ind.
 Hulson Grate Company, Inc., Keokuk, Iowa.
 Hunt-Spiller Manufacturing Corporation, South Boston, Mass.
 Huron Manufacturing Company, Detroit.
 Hutchins Car Roofing Company, Detroit.
 Hyatt Roller Bearing Company, Newark, N. J.
 Illinois Steel Company, Chicago.
 Independent Pneumatic Tool Company, Chicago.
 Ingersoll Milling Machine Company, Rockford, Ill.
 Ingersoll-Rand Company, New York.
 International Machine Tool Company, Indianapolis.
 Irving Iron Works Company, Long Island City, N. Y.
 Irwin Auger Bit Company, Wilmington, Ohio.
 Jenkins Brothers, New York.
 Johns-Manville, Inc., New York.
 Jones & Lamson Machine Co., Springfield, Vt.
 Jones & Laughlin Steel Corp., Pittsburgh.
 Joyce-Cridland Company, Dayton, Ohio.
 Kearney & Trecker Corp., Milwaukee, Wis.
 Keller, William H., Inc., Grand Haven, Mich.
 Keller Mechanical Engineering Corp., Brooklyn, N. Y.
 Kerite Insulated Wire & Cable Co., New York.
 Key-Bolt Appliance Company, Orchard Park, N. Y.
 Keyoke Railway Equipment Company, Chicago.
 Keystone Grinder & Manufacturing Co., Pittsburgh.
 King Pneumatic Tool Company, Chicago.
 Klasing Car Brake Company, Chicago.
 Landis Machine Company, Inc., Waynesboro, Pa.
 Lebanon Steel Foundry, Lebanon, Pa.
 LeBlond Machine Tool Company, Cincinnati, Ohio.
 Lehmann Machine Company, St. Louis.
 Lehon Company, Chicago.
 Libbey Glass Manufacturing Company, Toledo, Ohio.
 Liberty Manufacturing Company, Pittsburgh.
 Link-Belt Company, Chicago.
 Locomotive Finished Material Company, Atchison, Kan.
 Locomotive Firebox Company, Chicago.
 Locomotive Stoker Company, Pittsburgh.
 Long, Jr., Company, Charles R., Louisville, Ky.
 Lovell & Co., F. H., Arlington, N. J.
 Lucas Machine Tool Company, Cleveland.
 Lukens Steel Company, Coatesville, Pa.
 Lunkenheimer Company, Cincinnati, Ohio.
 MacLean-Fogg Lock Nut Company, Chicago.
 Madison-Kipp Corporation, Madison, Wis.
 Manning, Maxwell & Moore, Inc., New York.
 Massachusetts Mohair Plush Company, Boston.
 Metal & Thermit Corp., New York.
 Midgley & Borrowdale, Chicago.
 Milar, Clinch & Co., Chicago.
 Milburn Company, Alexander, Baltimore.
 Miner, W. H., Inc., Chicago.
 More-Jones Brass & Metal Co., St. Louis.
 Morton Manufacturing Company, Muskegon Heights, Mich.
 Morton Manufacturing Company, New York.
 Mudge & Co., Chicago.
 McCabe Manufacturing Company, Lawrence, Mass.
 McConway & Torley Company, Pittsburgh.
 McCrosky Tool Corporation, Meadville, Pa.
 Nathan Manufacturing Company, New York.
 National Brake Company, Inc., Buffalo.
 National Lead Company, New York.
 National Lock Washer Company, Newark, N. J.
 National Malleable & Steel Castings Co., Cleveland.
 National Pneumatic Company, Philadelphia.
 National Railway Appliance Company, New York.
 National Safety Appliance Company, Chicago.
 National Safety Devices Company, Waterloo, Iowa.
 National Tube Company, Pittsburgh.
 Nazel Engineering & Machine Works, Philadelphia.
 New York Air Brake Company, New York.
 Niles Gear Company, Hamilton, Ohio.
 Niles Tool Works Company, Hamilton, Ohio.
 Norton Company, Worcester, Mass.
 Norton, A. O., Inc., Chicago.
 Nuttall Company, R. D., Pittsburgh.
 Oakley Chemical Company, New York.
 Ohio Brass Company, Mansfield, Ohio.
 Ohio Machine Tool Company, Kenton, Ohio.
 O. K. Tool Company, Inc., Shelton, Conn.
 Okadee Company, Chicago.
 Okenite Company, Passaic, N. J.
 Oliver Electric & Manufacturing Co., Chicago.
 Oxweld Railroad Service Company, Chicago.
 Paige & Jones Chemical Co., Inc., New York.
 Paint Products Corporation, Philadelphia.
 Fantasote Company, Inc., New York.
 Parkesburg Iron Company, Parkesburg, Pa.
 Paxton-Mitchell Company, Omaha, Neb.
 Pels & Co., Henry, Inc., New York.
 Penn Iron & Steel Co., Creighton, Pa.
 Pilliod Company, Swanton, Ohio.
 Pilot Packing Company, Inc., Chicago.
 Pittsburgh Steel Foundry Corp., Glassport, Pa.
 Pittsburgh Testing Laboratory, Pittsburgh.
 Pocket List of Railroad Officials, New York.
 Pratt & Lambert, Inc., Buffalo.
 Pratt & Whitney Co., Hamilton, Ohio.
 Premier Staybolt Company, Pittsburgh.
 Pressed Steel Car Company, New York.
 Production Machine Company, Greenfield, Mass.
 Pyle-National Company, Chicago.
 Q. and C. Company, New York.
 Quigley Furnace Specialties Company, New York.
 Racine Tool & Machine Co., Racine, Wis.
 Railroad Herald, Atlanta, Ga.
 Railway Devices Company, St. Louis.
 Railway Purchases & Stores, Chicago.
 Railway Review, Chicago.
 Railway Service & Supply Corp., Indianapolis.
 Ralston Steel Car Company, Columbus, Ohio.
 Reading Iron Company, Reading, Pa.
 Remington Typewriter Company, New York.
 Robinson & Co., Dwight P., Inc., New York.
 Rockford Machine Tool Company, Rockford, Ill.
 Roebbing's Sons Company, John A., Trenton, N. J.
 Rome Iron Mills, Inc., New York.
 Ryerson & Son., Joseph T., Inc., Chicago.
 S. K. F. Industries, Inc., New York.
 Safety Car Heating & Lighting Co., New York.
 Safety Emery Wheel Company, Springfield, Ohio.
 St. Louis Car Company, St. Louis.
 Sargent & Co., Chicago.
 Schaefer Equipment Company, Pittsburgh.
 Schatz Manufacturing Company, Poughkeepsie, N. Y.
 Scullin Steel Company, New York.
 Scully Steel & Iron Co., Chicago.
 Sellers & Company, William, Inc., Philadelphia.
 Service Supply Corporation, Philadelphia.
 Sherwin-Williams Company, Cleveland.
 Simmons-Boardman Publishing Company, New York.
 Simplex Wire & Cable Co., Boston.
 Skinner Chuck Company, New Britain, Conn.
 Southern Wheel Company, Pittsburgh.
 Southwark Foundry & Machine Co., Philadelphia.
 Special Bolt Machinery Corp., New York.
 Standard Car Truck Company, Chicago.
 Standard Coupler Company, New York.
 Standard Railway Equipment Company, New York.
 Standard Steel Works Company, Philadelphia.
 Standard Stoker Company, Inc., Chicago.
 Starrett Company, L. S., Athol, Mass.
 Stucki Company, A., Pittsburgh.
 Sullivan Machinery Company, Chicago.
 Sunbeam Electric Manufacturing Company, Evansville, Ind.
 Superheater Company, New York.

Superior Steel Castings Company, Benton Harbor, Mich.
 Swind Machinery Company, Philadelphia.
 Symington Company, Rochester, N. Y.
 Talmage Manufacturing Company, Cleveland.
 Templeton, Kenly & Company, Ltd., Chicago.
 Thomson Electric Welding Company, Lynn, Mass.
 Timken-Detroit Axle Company, Detroit.
 Timken Roller Bearing Company, Canton, Ohio.
 Transportation Devices Corporation, Indianapolis.
 Tuco Products Corporation, New York.
 Tyler Tube & Pipe Co., Washington, Pa.
 Ulster Iron Works, Dover, N. J.
 Underwood Corporation, H. B., Philadelphia.
 Union Asbestos & Rubber Co., Chicago.
 Union Carbide Sales Company, New York.
 Union Draft Gear Company, Chicago.
 Union Railway Equipment Company, Chicago.
 Union Metal Products Company, New York.
 Union Spring & Manufacturing Co., Pittsburgh.
 United Alloy Steel Corporation, Canton, Ohio.
 U. S. Metallic Packing Company, Philadelphia.
 United States Rubber Company, New York.
 Universal Draft Gear Attachment Company, Chicago.
 Universal Packing & Service Co., Chicago.
 Universal Packing Corporation, Pittsburgh.
 Valentine & Co., New York.
 Vanadium-Alloys Steel Company, Latrobe, Pa.
 Vanadium Corporation of America, New York.
 Vapor Car Heating Company, Inc., Chicago.
 Viloco Railway Equipment Company, Chicago.
 Vulcan Electric Brazier & Welder Co., Paterson, N. J.
 Walker Draft Gear Corporation, New York.
 Walraven Company, Atlanta, Ga.
 Walworth Company, Boston, Mass.
 Warner & Swasey Co., Cleveland, Ohio.
 Watson-Stillman Company, New York.
 Waugh Equipment Company, Chicago.
 West Disinfecting Company, Chicago.
 Western Railway Equipment Company, St. Louis.
 Westinghouse Air Brake Company, Wilmerding, Pa.
 Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
 Wheel Truing Brake Shoe Company, Detroit, Mich.
 Whitehead & Kales Co., River Rouge, Mich.
 Whiting Corporation, Harvey, Ill.
 Willard Storage Battery Company, Cleveland.
 Wilson Imperial Company, Newark, N. J.
 Wine Railway Appliance Company, Toledo, Ohio.
 Wood, Iron & Steel Co., Alan, Philadelphia.
 Wood Conversion Company, Chicago.
 Woods & Company, Edwin S., Chicago.
 Worthington Pump & Machinery Corp., New York.
 Yale & Towne Manufacturing Co., Stamford, Conn.

Track Exhibits

*American Locomotive Company, New York.
 *Baldwin Locomotive Works, Philadelphia.
 *Brill Company, Philadelphia.
 *Clark Car Company, Pittsburgh.
 *General Electric Company, Schenectady, N. Y.
 *Globe Railway Equipment Company, St. Louis.
 Railway Locomotor Company, Chicago.
 Rodger Ballast Car Company, Chicago.
 *Also Pier Exhibit.

Motor Transport Exhibition in Tent

American Car & Foundry Motors Co., New York.
 Garford Motor Truck Company, Lima, Ohio.
 Graham Brothers, Detroit.
 International Harvester Company of America, Chicago.
 International Motor Company, New York.
 Lang Body Company, Cleveland.
 Reo Motor Car Company, Lansing, Mich.
 Six-Wheel Company, Philadelphia.
 Studebaker Corporation of America, South Bend, Ind.
 White Company, Cleveland.
 Yellow Truck & Coach Manufacturing Co., Chicago.
 †Baker-Roulang Company, Cleveland.
 ‡Timken-Detroit Axle Company, Detroit.
 †Also Pier Exhibit.

Safety Section A. R. A.

The Safety Section of the American Railway Association will open its sixth annual meeting at Hotel Statler, St. Louis, Mo., on Tuesday morning, April 27, with an address by L. W. Baldwin, president of the Missouri Pacific. The next business will be the report of the committee on statistics, T. H. Carrow, chairman. Following are the principal features of the program:

TUESDAY AFTERNOON

Report of committee on publicity and education, L. G. Bentley, chairman.
 Address on public safety by Charles F. Carter, (N. Y. C.).
 First aid, by W. A. Booth, (C. N. R.).
 Accident records vs. accident reports, D. G. Phillips (Wabash).

WEDNESDAY MORNING

Highway crossings, H. A. Rowe.
 Train service accidents, C. L. LaFontaine, (G. N.).
 Training men for safety, Fred Meyers, (Wabash).
 Election of Officers.

WEDNESDAY AFTERNOON

General round-table discussion; F. W. Curtis (D. & R. G. W.); H. S. Corbin, (A. C. L.); E. M. Harris (N. Y., N. H. & H.).

THURSDAY MORNING

Thirteen Years of Safety, W. H. Cameron.
 Maintenance of Equipment, J. E. Long, (D. & H.).
 Steel Car Repair Shops, H. G. Hassler, (Penn.).
 Maintenance of Way, J. D. White, (I. C.).

Traffic News

The Atlantic Coast Line announces twenty homeseekers' excursions to Florida during the coming seven months, to be sold on the first and third Tuesdays of each month. The rate for the round trip will be one fare plus two dollars.

The Illinois Central, beginning on May 16, will make the Panama Limited between Chicago and New Orleans, La., an extra fare train and will reduce the running time from 23 to 21 hours. The train will leave Chicago at 12:30 p. m. as at present and will arrive in New Orleans at 9:30 the following morning. The distance between Chicago and New Orleans is 921 miles.

The Pennsylvania, on April 25, will put on a sleeping car between Chicago and Richmond, Ind. The car will leave Chicago daily at 9:15 p. m., except Saturday. The car from Richmond will leave daily at 6:15 p. m., except Sunday, by way of Logansport, Ind., where it will connect with the northbound Southland, arriving in Chicago at 7:55 a. m.

The Curtis Bay Coal Pier of the Baltimore & Ohio at Baltimore, Md., on April 13 broke its own (and the world's) record for fast loading of coal when it placed 11,353 tons of coal aboard the S. S. "Lemuel Burrows" in 3 hours and 1 minute, an average of 62.7 tons a minute or a little more than a ton a second. The previous speed recorded was at the rate of 61.2 tons a minute in 1920. In making this new record there were dumped 246 fifty-ton cars of coal. Had they been seventy-ton cars which the pier is capable of handling with the same ease and facility the loading of the vessel would have been completed in much less time.

The Long Island announces that beginning with May 15, users of regular monthly commutation tickets may purchase tickets for a month and a half. This regulation for the convenience of patrons in the vacation season is an amplification of a similar but more limited privilege heretofore enjoyed. Commuters who leave their tickets at home and have to pay full fare, may, under new regulations, have the extra fare returned to them. Family tickets for 50 rides, good for one year, will hereafter be usable for family servants; and the term "member of the family" will not only include sons and daughters but other relatives who are dependent and live under the same roof. These tickets will still be unavailable for visitors and other persons outside the family.

The Boston & Maine will, with the new timetable going into effect on April 25, increase the average speed of a large number of its trains. The running time in some cases being reduced twenty-five per cent. "Virtually every train on the system has been quickened from one minute to more than 1½ hours." The Pine Tree Limited, the fast train between Boston and Portland, put on a few months ago, is to be duplicated by the "Flying Yankee," so that there will be a fast train each way in the morning and one each way in the afternoon. The Flying Yankee will run via Lawrence, Haverhill and Dover. Where the quickening of schedules or the omission of stops diminishes service at way stations, buses on the highways will in many or most cases supplement the rail service.

The Southern has filed with the Interstate Commerce Commission its reply to a questionnaire regarding the application of the Louisville & Nashville for authority to build a connection between its line and that of the Carolina, Clinchfield & Ohio, serving the Harlan county (Kentucky) coal fields. The Southern states that it is "not its policy to oppose construction of new lines by its neighbors and competitors and it is not proposed to oppose this construction if there be no attempt to change the rate bases now in effect, whereby the public or this respondent may be affected." However, it says, its traffic would be affected and its ability to serve the public impaired "if the new route should be opened from mines on the applicant's line in Harlan county and the same rates applied as are now applied, from mines in the Appalachia district and Southwest Virginia to points in North Carolina, South Carolina and certain other southeastern points. It would disturb the existing rate bases, necessitate a readjust-

ment of all coal rates, and impair the relative relationship of the different coal fields one to the other, that would result in a burden upon them, as well as upon this respondent, that would impair this respondent's ability to serve the public."

B. & O. Trains to Use Jersey Central

Terminal at New York After September 1

The Baltimore & Ohio, which since federal control has used the Pennsylvania station, New York, as its passenger terminal in that city, will on September 1 abandon this station and resume operation into the Central of New Jersey terminal at Jersey City, which was its New York passenger terminal prior to 1918.

Motor Transport News

National Highway Traffic Association Meeting

The National Highway Traffic Association will hold its annual meeting at the Automobile Club of America, 12 East Fifty-third street, New York, on April 30. The program follows:

FRIDAY, APRIL 30, 1926

Afternoon Session, 2:30 P. M.

Address on The Trend of Motor Vehicle Legislation, Russell H. Huffman, secretary, motor vehicle conference committee, National Automobile Chamber of Commerce.

Address on Synchronous Utilization of Highway Transport and Railroad Transportation, George H. Pride, president, Heavy Haulage Company, New York.

Report of National Committee on Regulation of Pedestrian Traffic, chairman, Professor Lewis W. McIntyre, civil engineering department, University of Pittsburgh.

Address on Metropolitan Traffic Control, Harold M. Lewis, executive engineer, Regional Plan of New York and Its Environs.

Address on The Economic Field and Future of the Rent-a-Car, P. L. Emerson, president, Yellow Manufacturing Sales Corporation, Chicago.

Address on Organizations for Traffic Planning in Municipalities, Arthur H. Blanchard, professor of highway engineering and highway transport, University of Michigan.

Evening Session, 8:00 P. M.

Address on The High Cost of Bottlenecks on Highways, G. E. Hamlin, superintendent of repairs, Connecticut State Highway Department.

Address on High Speed Highways Required for Economic Transportation, Ernest P. Goodrich, consulting engineer, New York.

Report of National Committee on Traffic Control Signal Systems at Street Intersections, chairman, Col. I. C. Moller, assistant director and traffic engineer, Commissioners of the District of Columbia, Washington, D. C.

Address on Illumination of Highways, David Beecroft, vice-president, Chilton Class Journal Company, New York.

Address on Aerial Photography as an Aid in Highway Traffic Surveys, Chas. F. Keale, Jr., chief engineer, Airmap Corporation of America, New York.

Address on Highway Safety Promoted by Adequate Brakes on Motor Buses and Trucks, David C. Fenner, manager, public works department, International Motor Company.

National Transportation and Service Meeting

Plans are being made for a three-day national automotive transportation and service meeting to be held in Boston on November 16, 17 and 18 by the Society of Automotive Engineers. Members of all societies and associations that are interested in the subjects to be discussed are to be invited to attend the technical sessions and a banquet to be held on one of the evenings.

Each day of the meeting there will be technical sessions in the forenoon and afternoon, and on the second day an inspection trip of great interest will be made to the maintenance plant of a local company that operates a great number of motor trucks. The technical sessions will be devoted to discussion of problems of design, engineering, operation and maintenance of trucks and motor coaches. Addresses are to be made by recognized experts on the subjects of the co-ordination of motor coach systems and railroads, the operation and maintenance of motor truck and motor coach fleets, freight handling and store-door delivery by automotive equipment, the handling of goods in interchangeable containers, the cost of operating gasoline-electric vehicles, the brake requirements of trucks and coaches, maintenance tools, and the relation of design to the power characteristics of the engine.

A special committee appointed to select the subjects and speakers for the meeting program is composed as follows: J. F. Winchester, Standard Oil Co., Baltimore, chairman; H. R. Cobleigh, National Automobile Chamber of Commerce, New York; C. O. Guernsey, J. G. Brill Co., Philadelphia; A. W. Herrington, consulting engineer, Washington; F. C. Horner, General Motors Corporation, New York; F. E. H. Johnson, Noyes-Buick Co., Boston; A. F. Masury, International Motor Co., New York; V. A. Nielsen, V. A. Nielsen Co., Boston; R. E. Plimpton, McGraw Hill Publishing Co., New York; F. J. Scarr, Pennsylvania Railroad Co., Philadelphia; E. W. Templin, Six Wheel Co., Philadelphia; G. S. Whitman, Charles Street Garage Co., Boston.

Commission and Court News

Interstate Commerce Commission

The commission has discontinued its investigation as to the adequacy of locomotives and cars owned by common carriers used in the transportation of freight, which was instituted several years ago at a time of car shortage.

The Interstate Commerce Commission has suspended from April 23 until August 21, the operation of proposed increases in the rates on eggs in straight carloads, or in mixed carloads with dressed poultry, from producing points in Arkansas and Oklahoma to New Orleans, La.

A questionnaire calling for detailed information as to the use of business, official or other private passenger-train cars at less than published tariff rates in the years 1923, 1924 and 1925, has been addressed to all railroads by the Interstate Commerce Commission in connection with its investigation, ordered some time ago. Information is asked as to who used the cars in each case, details regarding the trips made, and copies of all forms, reports or statements used in connection with the handling of such cars. Reports are also called for as to all commissary or other supply items furnished and as to how the items were billed.

Lake Cargo Coal Rate Cases Re-Opened

The commission has re-opened for further hearing the lake cargo coal rate cases, involving the relationship between rates on bituminous coal from the various coal fields to Lake Erie ports. These rates have been before the commission on several occasions and its latest decision has been the cause of much controversy among the competing fields and in Congress.

Proposed Report on Grain Rates

Grain rates between Illinois, Iowa, Minnesota, North Dakota, South Dakota and Wisconsin points, were on April 16 approved in part and disapproved in part in a proposed report by Examiner Harris Fleming. The examiner recommends findings that the rates on grain and grain products and flaxseed from North Dakota points to Minneapolis and Duluth and on grain and grain products other than flaxseed from South Dakota points to those destinations and various other markets are not unreasonable. On the other hand he finds that the rate adjustment to Duluth and Minneapolis on flaxseed from North Dakota and on grain from points in North and South Dakota and in Minnesota is unduly preferential of Minnesota shippers. He approves proposed changes in rates, mainly increases, on grain and grain products other than flaxseed, principally from North Dakota and Minnesota to certain of the larger terminal markets.

Personnel of Commissions

T. S. Loutit, attorney, of Stockton, has been appointed a member of the railroad commission of California succeeding the late George S. Squires.

The Senate on April 16 confirmed the President's reappointments of Samuel Higgins, Ben W. Hooper and W. L. McMenimen as members of the Railroad Labor Board.

The governor of New York has appointed as members of the State Transit Commission (to regulate rapid transit in New York City) John F. Gilchrist, Leon G. Godley and Charles C. Lockwood. The terms of the former commissioners Messrs. McAneny, O'Ryan and Harkness expired on April 16. The governor, on April 15, approved the law to reorganize this commission and to make it a part of the State Public Service Commission, as recommended, in January, by the commission appointed to present a plan for reorganizing the state government.

Equipment and Supplies

Locomotives

THE ILLINOIS CENTRAL is inquiring for 20 Mountain type locomotives.

THE DELAWARE & HUDSON is inquiring for from one to 15 consolidation type locomotives.

THE SOUTHERN PACIFIC will construct 5 Mountain type locomotives in its shops at Sacramento, Cal.

THE YUNNAN KOPEI RAILWAY (China) has ordered 6 ten-wheel switching locomotives from the Baldwin Locomotive Works.

THE CHICAGO & ILLINOIS WESTERN has ordered two eight-wheel switching locomotives from the Baldwin Locomotive Works.

THE AMERICAN RAILROAD OF PORTO RICO has ordered one six-wheel switching locomotive from the Baldwin Locomotive Works.

THE UTAH COPPER COMPANY has ordered one 60-ton oil-electric locomotive from the American Locomotive Company, the General Electric Company and the Ingersoll-Rand Company, which companies co-operate in its manufacture.

Freight Cars

THE SOUTHERN PACIFIC will construct 650 box cars in its shops at Sacramento, Cal.

THE MUNCIE & WESTERN is inquiring for 50 single sheathed box cars of 40 tons' capacity.

THE ATLANTIC COAST LINE is inquiring for 1,000 low side gondola cars of 50 tons' capacity.

W. R. GRACE & CO., New York, have renewed an inquiry for 201 miscellaneous freight cars for service in South America.

THE CUBAN AMERICAN SUGAR COMPANY is inquiring for 100 sugar cane cars with steel underframes, of 15 tons' capacity.

THE NATIONAL TUBE COMPANY is inquiring for 14 skelp cars of 100 tons' capacity. This company is also inquiring for 25 car bodies.

THE CENTRAL OF NEW JERSEY has ordered 100 gondola cars of 70 tons' capacity from the Bethlehem Steel Company. Inquiry for this equipment was reported in the *Railway Age* of March 20.

THE EAST BROAD TOP RAILROAD & COAL COMPANY is building 25 hopper cars of 35 tons' capacity in its own shops. Inquiry for this equipment was reported in the *Railway Age* of March 20.

THE SOUTH PORTO RICO SUGAR COMPANY is inquiring for 16 flat cars of 40 tons' capacity. This company is also inquiring for 100 sugar cane cars, as was reported in the *Railway Age* of April 10.

Passenger Cars

THE BANGOR & AROOSTOOK is inquiring for one dining car.

THE LEHIGH VALLEY is inquiring for a number of gas-electric motor and trailer cars.

PHILADELPHIA SUBWAYS.—The City Board of Transportation of Philadelphia contemplates buying about 150 cars for subway service.

THE PITTSBURGH, SHAWMUT & NORTHERN has ordered one combination passenger and baggage, gasoline rail motor car, from the J. G. Brill Company.

THE CANADIAN NATIONAL has ordered 50 express refrigerator cars from the National Steel Car Corporation. Inquiry for this equipment was reported in the *Railway Age* of March 13.

Iron and Steel

THE PENNSYLVANIA is inquiring for 400 tons of steel for a bridge at Columbus, Ohio.

THE ATLANTIC COAST LINE has ordered 200 tons of bridge steel from the American Bridge Company.

THE WESTERN MARYLAND has ordered 600 tons of bridge steel from the American Bridge Company.

THE ERIE has ordered 200 tons of structural steel for bridge work from the American Bridge Company.

THE SOUTHERN RAILWAY has ordered 200 tons of steel for two bridges from the Virginia Bridge & Iron Company.

THE BALTIMORE & OHIO has ordered 800 tons of structural steel for two bridges from the Mt. Vernon Bridge Company.

THE GULF, COLORADO & SANTA FE has ordered 175 tons of structural steel for its shops at Cleburne, Tex., from the Truscon Steel Company.

Machinery and Tools

THE NEW YORK CENTRAL has ordered a 32-in. shaper from Joseph T. Ryerson & Son, Inc.

THE ILLINOIS CENTRAL has ordered two ditchers from the American Hoist & Derrick Co.

THE MISSOURI-KANSAS-TEXAS has ordered one 86-in. heavy guide bar grinder from Manning, Maxwell & Moore, Inc.

THE BOSTON & ALBANY has ordered a 1,250-lb. steam hammer and a 200-lb. air hammer from Manning, Maxwell & Moore, Inc.

THE BOSTON & MAINE has ordered a 3,300-lb. steam hammer from Manning, Maxwell & Moore, and two 36-in. shapers from Joseph T. Ryerson & Son, Inc.

THE PULLMAN CAR & MANUFACTURING CORPORATION has ordered three Putnam combination car journal and axle lathes from Manning, Maxwell & Moore, Inc.

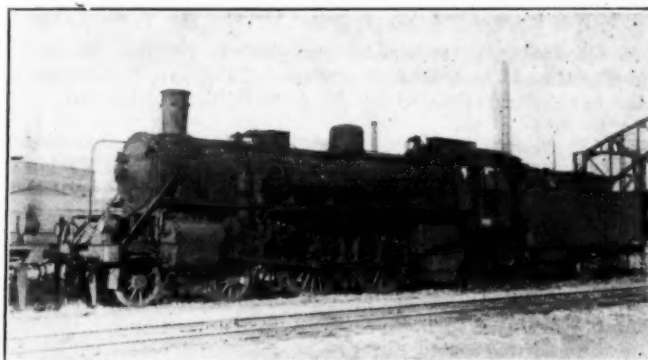
THE PENNSYLVANIA has ordered one Micro cylinder grinder, one 20-in. by 10-ft. lathe and two motor driven floor grinders from Manning, Maxwell & Moore, Inc.

Miscellaneous

THE FLORIDA EAST COAST has ordered a turntable, involving 200 tons of steel, for service at St. Augustine, Fla., from the American Bridge Company.

Signaling

THE NORFOLK & WESTERN has ordered from the Union Switch & Signal Company, 228 position light signals for installation on the Cincinnati division, between Portsmouth, Ohio, and Cincinnati, the order including also 744 a.c. relays, 465 transformers and other apparatus.



A Prussian Atlantic Type

Supply Trade News

The Rail Joint Company on May 1 will remove its office from 61 Broadway to 165 Broadway, New York City.

F. O. Bailey, manager of sales of the Gold Car Heating & Lighting Company, New York, died at his home in Brooklyn on April 14.

H. I. Keen has been appointed managing director of the newly incorporated Allis-Chalmers Company of France, with headquarters at Paris, France.

Avery Adams has been appointed assistant general manager of sales of the Trumbull Steel Company, Warren, Ohio, to succeed Arthur Long, resigned.

G. Charter Harrison, general sales manager of the French Battery Company, Madison, Wis., has been elected a vice-president and director. He was born in London, England, on September 21, 1881, and was educated at the University College School, London, and at the Institute of Chartered Accountants. He entered business as a clerk with W. B. Keen & Co., chartered accountants, London, and in 1906 was appointed manager of the System division of Price, Waterhouse Co., New York. For two years he was controller of the Russell, Burdall & Ward Bolt & Nut Company. In 1916 he organized Management Engineering Practice, G. Charter Harrison, Associates, and later Stevenson, Harrison & Jordan, industrial engineers, New York. He originated scientific methods of cost predetermination, which represent the application of scientific management principles in cost accounting, and also developed scientific co-ordinated cost, planning and production methods. Mr. Harrison is retaining his interest in the firm of Stevenson, Harrison & Jordan.



G. C. Harrison

W. S. Kinnear & Co., consulting engineers, have removed their office to the Bowery Savings Bank building, 110 East Forty-second street, New York City.

The Cutter Electrical & Manufacturing Company, Philadelphia, Pa., will remove its New York City office from 1170 Broadway to 12 East Forty-first street about May 1.

R. R. Baxter, superintendent of the car building plants of the Tennessee Coal, Iron & Railroad Company, Birmingham, Ala., has been appointed assistant to the vice-president.

George T. Ramsey has been appointed railroad department representative in the East, of the United Alloy Steel Corporation, Canton, Ohio. Mr. Ramsey will have his headquarters at the company's office in the Pershing Square building, New York City.

The Central States General Electric Supply Company, Chicago, General Electric merchandise distributor, has taken over the business formerly carried on by the Central Electric Company of that city. The management and personnel of the Central Electric Company will continue to operate the business of the new corporation.

The Oliver Electric & Manufacturing Company, St. Louis, Mo., has been merged with the Pyle-National Company, Chicago, the personnel of the Oliver Electric & Manufacturing Company retaining its identity with the Pyle-National Company. The offices of the Oliver Electric Company have been moved to 1334 North Kostner avenue, Chicago.

Ross F. Hayes, railway supplies, has removed his office from 2 Rector street to 30 Church street, New York. Mr. Hayes represents the Henry Giessel Company; the railway department at Newburg, N. Y., of E. I. DuPont de Nemours & Co., Inc.; the D. P. Company, maker of steel dust guards and the Protecto Manufacturing Company, maker of weather-stripping.

W. H. Vinnedge, until recently sales engineer with the Servell Corporation, has joined the railway engineer staff of the American Brown Boveri Electric Corporation. After graduating from Purdue University, Mr. Vinnedge joined the Westinghouse Electric & Manufacturing Company where he was engaged in the application of transformers, motors, meters, etc., to railroad work. He has also served as a sales engineer for the Duplex Light Company.

The Graybar Electric Company, New York, has reorganized its sales department involving the reallocation of the managing personnel and the creation of several new activities as follows: M. A. Curran, assistant to vice-president, formerly manager of the central station department; J. L. Ray, general supply sales manager, formerly manager of supply and equipment department; E. A. Hawkins, general telephone and appliance sales manager; G. F. Hessler, general utilities sales manager, formerly manager line material sales department; G. K. Heyer, assistant general supply sales manager, formerly telephone sales manager; A. J. Eaves, public address and carrier sales manager; P. M. Rainey, telephone sales manager, formerly sales development manager; O. E. Richardson, broadcasting sales engineer; J. W. Skinkle, signaling sales manager; A. E. Hetzner, signaling sales engineer, and A. S. Wise, appliance sales engineer.

Stockholders Approve American Locomotive Merger

Merger of the American Locomotive Company and the Railway Steel Spring Company was approved on April 20 when the stockholders of the former company voted to authorize the proposed change in the company's capitalization. The change calls for increases from 250,000 shares of \$100 par preferred stock and 500,000 shares of no par common stock to 385,000 shares of the preferred and 770,000 shares of the common. The preferred stock will be exchanged on a share-for-share basis, while one share of Railway Steel Spring Company common will be exchanged for two-thirds of a share of American Locomotive Company. All the directors of American Locomotive were re-elected and the size of the board was increased from 11 to 15.

American Brown Boveri Electric Corporation

The annual report of the American Brown Boveri Electric Corporation for the calendar year ended December 31, 1925, shows net income after depreciation and interest charges but before provision for income taxes of \$1,708,690, this representing the combined income of the parent company and its subsidiaries, the Condit Electrical Manufacturing Company, the Scintilla Magneto Company, Inc., the Moloney Electric Company, the Railway & Industrial Equipment Company, and the Electrical Development & Machine Company. The annual report is an interesting document in that it contains a seven-page illustrated statement to the stockholders signed by Laurence R. Wilder, president, amplifying the figures in the annual report, detailing the company's history and describing the plants of the parent company and its several subsidiaries. The illustrations include views of the several plants and typical installations of equipment. The combined income account follows:

Net profit from operations.....	\$1,254,290
Other income.....	485,721
Gross income.....	\$1,740,011
Income charges.....	31,321
Adjusted net income after depreciation and interest charges and before provision for income taxes.....	\$1,708,690

Obituary

Patrick J. Sullivan, railway building construction contractor, Denver, Colo., died on April 11.

Charles Leonard Rowland, engineer, of Carbondale, Pa., died on April 19 at the Post Graduate Hospital, New York. Mr. Rowland was born in Brooklyn, N. Y., on November 28, 1852. He began his career with the Morton Iron Works, Brooklyn. In 1908 he founded the American Welding Company of Carbondale, of which he was president until last February, when the company was merged with the American Car & Foundry Company. During the World War Mr. Rowland invented a one-ton container for transporting chlorine gas overseas.

Trade Publications

FLOODLIGHT PROJECTORS.—Bulletin No. 2083 descriptive of short range Imperial floodlight projectors has been issued by the Crouse-Hinds Company, Syracuse, N. Y.

REFRACTORY GUN.—The use of the Quigley refractory gun for the quick repair and maintenance of furnace linings, including hot patching and surface coating, is described in a 14-page illustrated booklet issued by the Quigley Furnace Specialties Company, 26 Cortlandt street, New York.

MOTOR CAR ACCESSORIES.—Mudge & Co., Chicago, has just issued a new circular on motor car accessories, adaptable to all makes and types of motor cars. The items included are wheels, axles, bearings, windshields, gongs, headlights, skids, safety railings and other similar equipment.

THE OHIO BRASS COMPANY has recently issued an attractive bulletin describing the use of low resistance welded bonds for signal track circuits. In addition to data on the savings produced by these bonds a detailed description is given of their standard bond and also of their new bond specially designed for heavily beaded joints.

SPECIFICATIONS FOR THE USE OF CELITE.—In Bulletin No. 317 issued by the Celite Products Company, Los Angeles, Cal., specifications for the use of architects and engineers are presented covering the use of Celite as an admixture in concrete and the grade of diatomaceous silica to be used for this purpose. These specifications cover the detailed methods of making the necessary tests and outline complete instructions for use.

REX FLINTKOTE ASPHALT EMULSION.—This is the name of a folder recently issued by the Flintkote Company, New York, as a special report to engineers interested in waterproofing and the protection of structures against rust, acid and gas corrosion. Dealing specifically with the newly developed product of this company, Rex Flintkote Asphalt Emulsion, complete details are given as to its manufacture, characteristics, uses and advantages.

WROUGHT PIPE.—A new educational motion picture film, entitled "The Arteries of Industry," is described in a 16-page folder which has been issued by the National Tube Company, Frick building, Pittsburgh, Pa. This film illustrates the process of manufacture of National pipe, step by step, from the mining of the ore to the final tests and inspections. Many of the more important steps also are illustrated graphically by animated diagrams.

STANDARD SECTION AND HEAVY DUTY MOTOR CARS.—Mudge & Co., Chicago, has just issued revised specification sheets on both the class WS-2 standard section motor car and the class WS-3 heavy duty motor car. In addition to a page of specifications these sheets, which are in folder form, contain large scale illustrations of the cars complete, together with small cuts illustrating various detailed features accompanied by descriptive matter pointing out the particular advantages of the installation.

PNEUMATIC TOOLS.—Catalogue No. 15, descriptive of Thor pneumatic tools, including accessories, busters, drills, grinders, hammers, hoists, holders-on, etc., has been issued by the Independent Pneumatic Tool Company, 600 West Jackson boulevard, Chicago. Instructions for the maintenance and ordering of pneumatic tools and their weights and dimensions packed for export are given, also illustrations showing the use of the tools in building cars and locomotives, in building ships, in boiler shops, foundries, machine shops and steel mills, etc.

Railway Construction

BALTIMORE & OHIO.—This company has awarded a contract to the Vang Construction Company, Cumberland, Md., for the reconstruction of bridges at Aviston, Ill., Marten, O., and Noble, O., to cost respectively \$26,000, \$28,000 and \$21,000. A contract for the reconstruction of a bridge between Farmers, O., and Musselman, to cost approximately \$21,000, has been awarded to the Empire Construction Company, Baltimore, Md. The same company has a contract for the reconstruction of a bridge at Beaver Dam, Md., to cost approximately \$32,000. A contract has been awarded to the Sheesley & Janney Co., Johnstown, Pa., for the reconstruction of two bridges at Salem, Ill., at an estimated cost of \$29,000. A contract for grading for a yard at Ohio Junction, O., to cost approximately \$30,000, has been awarded to Bates & Rogers, Cleveland, O.

BOSTON & ALBANY.—A contract has been awarded to the Palmer Steel Company, Inc., Springfield, Mass., for structural steel for five signal bridges at Springfield.

GULF, COLORADO & SANTA FE.—This company has applied to the Interstate Commerce Commission for authority to build a line of 7.95 miles from Hale, Tex., to a point near the plant of the Texas Portland Cement Company, in Dallas county, Tex.

NEW YORK, CHICAGO & ST. LOUIS.—A contract has been awarded to the Austin Company, Cleveland, Ohio, for the construction of a shop building at Frankfort, Ind., to cost \$50,000, as reported in the *Railway Age* of March 20. The new structure will replace a building recently destroyed by fire.

NORTHERN PACIFIC.—Plans have been prepared for the rebuilding of a bridge across the Mississippi river at Minneapolis, Minn. Strengthening of the bridge, which is 30 years old, has been made necessary by the use of heavier locomotives.

PENNSYLVANIA.—A contract has been awarded to the Minton-Scobell Company, Cleveland, Ohio, for the remodeling of the Rosenthal building at Columbus, Ohio, for use as a commissary building. It will cost approximately \$53,000. A contract has also been awarded to the T. J. Foley Company, Pittsburgh, Pa., for the construction of an overhead bridge at Market street, Marcus Hook, Pa., to eliminate the grade crossing, to cost \$400,000, the cost to be shared jointly by the county, township, borough and railroad company.

TEXAS, PANHANDLE & GULF.—The Atchison, Topeka & Santa Fe and its subsidiary, the Pecos & Northern Texas, have petitioned the Interstate Commerce Commission for a reopening for further testimony of the case in which examiners of the commission recently recommended the issuance of a certificate to this company for the construction of a new line in Texas in territory in which the P. & N. T., and a subsidiary of the Burlington system had also applied for authority to build new lines. They also asked for leave to intervene in the case and that five cases, involving proposed construction of approximately 800 miles of new line in Texas, be consolidated into one proceeding. They also asked that the time for filing exceptions to the examiners' report be extended. The Texas, Panhandle & Gulf, to which the proposed report recommended that a certificate be issued on condition that the company be financed and controlled by a large system other than the Santa Fe or Burlington, objected to the reopening of the case, but did not object to the request for intervention nor the consolidation of the cases. The Fort Worth & Denver South Plains, the Dallas Chamber of Commerce and the South Plains Railroad Committee, took a similar position provided the proceedings should not be delayed.

WABASH.—Counsel for this company have filed with the United States Supreme Court a brief supporting the railway's contention that a grade crossing at Delmar boulevard in St. Louis, Mo., should be eliminated by the elevation rather than the depression of tracks. The appeal was taken to the Federal Supreme Court after the Supreme Court of Missouri had ruled for the city that the tracks should be depressed. Submission to the United States Supreme Court charged four particulars of error in the decision of the state Supreme Court.

New York Plans to Spend \$20,000,000

Immediately on Grade Crossings

The Public Service Commission of New York on April 15 adopted a general plan for the immediate utilization of \$20,000,000 of the \$300,000,000 bond issue for the elimination of grade crossings of highways with railroads, and will take measures to have early hearings, preparatory to issuing orders to deal with crossings in a large number of cities and towns. The new law does not require a petition to be filed by either the railroad or the town. It is expected that some of the work may be put under contract by July 1. Following is a condensed list of the 114 projects (to cover 174 crossings) which are embraced within the present scheme:

	Estimated total cost.
Boston & Albany	
Chatham; Main and Austerlitz streets	\$372,000.
Boston & Maine	
Hoosick; Main street, county highway 1426	87,000
Valley Falls; Main street	94,000
Delaware, Lackawanna & Western	
Vestal; Bridge street, county highway 420	116,000
Elmira; Water street	132,000
and Madison, Lake, Dickinson and Washington streets	475,000
Cheektowaga; Broadway and Williamsville road and Schoolhouse road	150,000
Tully; State highway 5516 and Shelle street	97,000
Baldwinsville; Genesee street, county highway 1039	140,000
Sangerfield; Cherry valley turnpike, federal aid highway 8046	97,000
Utica; Genesee street, county highway 250	93,000
Barker and Greene; River road, county highways 375 and state highway 5565	127,000
Erie	
Hillburn; Tuxedo turnpike, state highway 5388	116,000
Elmira; Sixteen streets	3,286,000
Allegany; College crossing	67,000
Jamestown; Buffalo street	140,000
Depew; Broadway county highway 916, and Williamsville road	150,000
Rochester; Elmwood avenue	86,000
Genesee & Wyoming	
Caledonia; State road, state highway	75,000
Buffalo, Rochester & Pittsburgh	
East Hamburg; Big Tree road, county highway 1586	76,000
Springville; Main street, county highway 989	89,000
Chili; Paul road, county highway 78	101,000
LeRoy; West Main street, state highway 5136	119,000
Gainesville; Main street, state highway	115,000
Central New England	
Plattsburgh; Modena turnpike, state highway 351	101,000
East Fishkill; Stormville	83,000
Pawling; Stonehouse, county highway 1163	111,000
Delaware & Hudson	
Windsor; Bridge street, state highway 5338	170,000
Afton; Maple street, county highway 1171	102,000
Otego; Crandalls, county highway 675; Oneonta, county highway 317	133,000
Richmondville; Francis crossing, county highway 1467	
Cobleskill; West, Elm and West Main streets, state highway 5458	245,000
Bethlehem; Delaware turnpike, county highway 41	68,000
Duanesburgh; County highway 1454	76,000
Northumberland; Gansevoort-Butlers State road, county highway, and Fullerton street	80,000
Queensbury; Warren street, County highway 656	100,000
Willsboro; Willsboro street, county highway 1641	90,000
Chazy; State road 5199	139,000
Lehigh & Hudson River	
Warwick; Main street	110,000
Lehigh Valley	
Waverly; Chemung street, state highway 5049	100,000
Fayette; Geneva-Syracuse road, state highway 5087	63,000
Manchester; Main street, county highway 1415	125,000
Depew; Broadway, county highway 916, and Williamsville road	150,000
Dryden; Main street, county highway 1002	126,000
Rochester; Elmwood avenue	85,000
Cazenovia; Albany street, state highway 5329	123,000
Amherst and Tonawanda; Niagara Falls boulevards	83,000
Newfield; Creedons	91,000
Fayette; Geneva-Syracuse road, state highway 5087, Waterloo road	83,000
Long Island	
Islip; Carleton avenue, county highway 1206	179,000
Riverhead; Main street, county highway 1720	100,000
Hempstead; Eleven streets	1,950,000
Brookhaven; South Country road, federal aid highway	54,000
Southampton; South Country road, county highway	65,000
Oyster Bay; Jericho turnpike, county highway 436	63,000
Smithtown; Main street, state highway 5232A	138,000
North Hempstead; East Williston road	170,000
Glen Cove; Duck Pond road	106,000
Babylon; Suffolk county, Broad Hollow road, county highway 1219	51,000
New York Central	
Rensselaer; Second avenue	190,000
Rotterdam; Carman, county highway 577	196,000
Little Falls; Second, Ann, Fifth Sixth and Lock streets	1,000,000
Savannah; Main street, state highway 5017	237,000
Brighton; Penfield road, county highway 166 and Rock Cut	132,000
Cheektowaga; Union road, county highway 1626 and Walden avenue (C. H. 1582)	151,000
Hamburg; Gowanda road, county highway 1067	124,000
Angola; Main street, county highway 990	184,000
Webb; Thendara, county highway 462	134,000
Aurelius; Clark street, county highway 590	86,000
Royalton; Long Road, state highway 556	110,000
Niagara; Military road	69,000
New Castle; highway 1015	115,000
Claverack; Martindale road	97,000
Sterling; Goodrich county highway 685	21,000
Boonville; Main street and Park avenue	155,000
Reading; Reading center, state highway 5334	80,000

Yonkers; Nepperhan-Tuckahoe road	176,000
Hastings; Plank road, state highway 5250	110,000
Leroy; Kennies state highway 5681	119,000
Canton; Buck, Minor, Park, Main, Harris and Pleasant streets	250,000
Clarkstown; Nyack turnpike	112,000
Coxsackie; Mansion street	117,000
Vernon; Morrisons	136,000
Savannah; Main street	97,000
Clarence; Main street, Clarence-Main street	137,000
New York, Chicago & St. Louis	
Hamburg; Athol springs road, county highway 106	41,000
Brandt; Buffalo-Erie road, state highway 5600	130,000
New York, Ontario & Western	
Wallkill; Plank road, state highway 5210-B	86,000
Fallsburgh; federal aid highway 8153	84,000
Liberty; Strongtown, state highway 8333	79,000
Faton; Morrisville, state highway 5330	150,000
Oneida; Seneca turnpike, state highway 5075	96,000
Central Square; Main street, state highway 5250	82,000
Madison; Bouckville, state highway 5380	121,000
New Hartford; Mooers, county highway 250	117,000
Pennsylvania	
Hamburg; Athol springs road, county highway 1067	41,000
Brandt; Buffalo-Erie road, state highway 5600	130,000
Sardinia; Protection, state road, state highway 5622, Coley road	103,000
East Aurora; Main street, state highway 5433, Oakwood avenue, Parsons, Olean street, (S.H. 5317)	630,000
Watkins; Fourth street, state highway 5295	100,000
Allegany; College crossing	67,000
Rutland	
Mooers; Bell, state highway 5485	111,000
Moira; Bell, state highway 5076	69,000
Stockholm; Winthrop, Main street, county highway 1548	120,000
Ulster & Delaware	
Middletown; county highway 239	109,000
Roxbury; Rice Clarks, state highway 5343	93,000
Davenport; state highway 5443	123,000
Arkade & Attica	
Sheldon; Varysburg, federal aid highway 8092	108,000
Delaware & Northern	
Hancock; East branch, state highway 5383-A	75,000
Fonda, Johnstown & Gloversville	
Fonda; Mohawk turnpike, state highway 5667	123,000
Louville & Beaver River	
New Bremen; Croghan road, county highway 1193	126,000
Middletown & Unionville	
Middletown; Dolson avenue	106,000
Norwood & St. Lawrence	
Norfolk; county highway	63,000
Pittsburgh, Shawmut & Northern	
Friendship; Cuba-Friendship road, state highway 5312	91,000
United States & Canada	
Fort Covington; Chateaugay street, county highway 1659	64,000

Long Island to Spend \$11,000,000

Improvements planned by the Long Island for 1926 reach a total outlay of approximately \$11,000,000. Among the major projects under way or to be started soon, are the following:

Work has been commenced on the extension of the electrified system from Floral Park to Mineola, on the main line, and from Mineola to Valley Stream on the New York Bay extension, or West Hempstead branch. The estimated cost of this project is about \$900,000. Weather permitting, the newly electrified line should be completed in time for the inauguration of electric train service when the winter schedule goes into effect in October. This involves installation of approximately fourteen miles of 150-lb. third rail, and changes in the existing track.

Preparations are being made to double track the Long Beach Branch from East Rockaway to Wreck Lead; estimated cost, about \$340,000.

Plans are being prepared for the installation of a second track on the Montauk division from Sayville to a point east of Patchogue, in addition to the construction of a storage yard and an engine terminal; estimated cost, more than \$500,000.

A total of 6,700 tons of 100-lb. rail have been ordered, and will be used to replace lighter rail and to provide additional running tracks and sidings. Tie plates and anti-creepers also ordered will bring the cost of this material up to about \$650,000.

New ties to the number of 155,000 have been ordered, for replacements and double-tracking on the Montauk and Long Beach divisions.

Stone ballast will replace cinders on about 12 miles of main line roadbed, and on 15 miles of roadbed on the Bay Ridge division.

It is proposed to erect two new passenger stations this year, one at Northport and the other at West Hempstead.

The grade crossing at Broadway, Elmhurst, is scheduled to be eliminated. This work is estimated to cost about \$450,000, one-half to be borne by the railroad, one-quarter by the state and one-quarter by the City of New York.

To comply with an order of the Public Service Commission, the road plans to eliminate the grade crossing at Mattituck, on the main line; cost, about \$75,000.

A new steel and concrete bridge is to be constructed over Queens boulevard, on the North Shore division; cost, over \$400,000.

Two bridges, to carry Forest Park drive over the Rockaway Beach and Montauk divisions, will be rebuilt; cost, about \$160,000.

Interlocking facilities at "VD" Tower, at Vanderbilt avenue, Atlantic division, will be renewed and enlarged; cost, about \$66,000. Interlocking changes at Freeport have also been authorized to be made this year, to facilitate train movements at Freeport. This work will cost approximately \$87,500.

Other improvement projects started in 1925 are still under way. The largest of these is the electrification of the Bay Ridge division, which is proceeding rapidly, in compliance with law requiring that all freight and passenger tracks within the limits of New York City shall be electrified.

Other improvements made necessary to comply with this law include the purchase of seven electric freight locomotives costing about \$910,000, a 100-ton oil-electric locomotive costing about \$100,000 (ordered last year) and a gas electric switching locomotive costing about \$60,000.

Two new car floats will shortly be added to floating equipment, at a cost of about \$200,000. There is also on order for early delivery an oil-electric shifting tugboat, to cost about \$195,000.

Twenty new all-steel passenger equipment cars for steam train service have been ordered and are scheduled for delivery this year. Their cost will be about \$370,000. The 20 steel parlor cars which the company owns and operated last year, are being converted into coaches at a cost of about \$132,000.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—1925 Earnings.—Annual report for 1925 shows net income after interest and other charges of \$46,157,934, equivalent after allowance for preferred dividends to \$17.18 a share on the common stock. Net corporate income in 1924 was \$42,151,806 or \$15.46 a share on the common. See excerpts from annual report on adjoining pages.

ATLANTA, BIRMINGHAM & ATLANTIC.—Stockholders' Committee Protests.—Charles E. Cotterell, an attorney of Atlanta, Ga., informed the Interstate Commerce Commission on April 16 that a committee of stockholders was being organized, which he represented, to contest before the courts and the commission the terms and conditions of the proposed reorganization plan and sale to the Atlantic Coast Line. He asked that the commission go into the whole matter thoroughly on the application of the Atlanta, Birmingham & Coast for approval of the plan.

BELT RAILWAY OF CHICAGO.—1925 Earnings.—Annual report for 1925 shows net income of \$286,919 as compared with \$254,049 in 1924. Selected items from the income statement follow:

BELT RAILWAY			
	1925	1924	Increase or decrease
Railway operating revenues.....	\$7,054,575	\$6,841,829	\$212,745
Total operating expenses.....	\$4,697,016	\$4,572,321	\$124,694
Operating ratio.....	66.58	66.83	—27
Net revenue from operations.....	\$2,357,559	\$2,269,508	\$88,051
Railway tax accruals.....	534,565	530,524	4,041
Railway operating income.....	\$1,822,994	\$1,738,078	\$84,916
Hire of freight cars—Cr. bal.....	\$177,592	\$62,407	\$115,185
Joint facility rents—Dr. bal.....	640,115	70,467	569,648
Total non-operating income.....	\$111,949	\$215,057	—\$103,108
Gross income.....	\$1,934,943	\$1,953,136	—\$18,192
Rent for leased roads.....	1,585,603	1,606,562	—20,959
Total deductions from gross income..	\$1,648,024	\$1,699,086	—\$51,062
Net income.....	\$286,919	\$254,049	\$32,870

ATLANTIC COAST LINE.—Extra Dividends.—Directors of the Atlantic Coast Line on April 20, declared the regular semi-annual dividend of \$3.50 on the common stock and an extra dividend of \$1.50, both payable July 10 to stockholders of record June 15.

Acquisition.—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Atlanta, Birmingham & Coast, a new company being organized to take over the properties of the Atlanta, Birmingham & Atlantic, by purchase of its common stock. It also proposes to guarantee the preferred stock.

BESSEMER & LAKE ERIE.—1925 Earnings.—Annual report for 1925 shows net income after interest and other charges of \$4,700,681 as compared with \$2,678,455 in 1924. Selected items from the income statement follow:

BESSEMER & LAKE ERIE			
	1925	1924	Increase or decrease
Average mileage operated.....	228.03	228.03	.....
Railway operating revenues.....	\$15,546,685	\$14,506,820	\$1,039,866
Total operating expenses.....	\$9,958,294	\$11,387,044	—\$1,428,750
Net revenue from operations.....	\$5,588,391	\$3,119,776	\$2,468,616
Railway tax accruals.....	838,436	882,016	—43,580
Railway operating income.....	\$4,749,955	\$2,237,760	\$2,512,195
Hire of freight cars—Cr. bal.....	\$524,309	\$497,038	\$27,271
Joint facility rents—Cr. bal.....	25,322	16,615	8,707
Total non-operating income.....	\$890,148	\$890,960	—\$812
Gross income.....	\$5,632,811	\$3,128,419	\$2,504,392
Rent for leased roads.....	5,967	5,952	15
Interest on funded debt.....	850,587	929,237	—78,650
Total deductions from gross income	\$932,130	\$449,964	\$482,166
Net income.....	\$4,700,681	\$2,678,455	\$2,022,226

CAPE FEAR RAILWAYS.—Operation of Line.—The Interstate Commerce Commission has issued a certificate authorizing the Cape

Fear Railways, Inc., organized under the laws of North Carolina on January 11, 1926, to operate in interstate and foreign commerce, a line of railroad from Skibo, N. C., to Fort Bragg, 7 miles. The line will serve the government reservation at Fort Bragg, local saw mills and fruit and gardening centers.

CENTRAL OF GEORGIA.—Bonds.—Authority to conditionally issue \$5,396,000 of refunding and general mortgage 5 per cent bonds has been asked of the Interstate Commerce Commission. The bonds are to reimburse the treasury for expenditures for additions and betterments and are to be held in the treasury, to be pledged from time to time as collateral for short term notes.

CENTRAL OF NEW JERSEY.—Six Months Guaranty.—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months' period following the termination of federal control as \$5,811,655 of which \$655,244 remained to be paid on the final certificate in addition to the partial payments which had been made.

CHESAPEAKE & OHIO.—Acquisition of Lines.—The Interstate Commerce Commission has authorized the Chesapeake & Ohio to acquire control of the Pond Fork & Bald Knob by purchase of its capital stock and by lease. The stock will be purchased from C. Crane & Co. The road extends from a connection with the Chesapeake & Ohio's Pond Fork branch at or near West Junction to a point at or near Rock Lick, 13.1 miles, all in Boone County, W. Va. It was built in 1921; its traffic at present is principally high-grade bituminous coal and there is also a considerable volume of lumber traffic. Most of the coal mines served are in the development stage and it is estimated that the total available coal in the area tributary to the line totals 1,300,000 tons.

The Chesapeake & Ohio has also been authorized to purchase the stock of the Island Creek which road is already leased by the company. The stock will be purchased from its present owners, the Island Creek Coal Company. The company operates from a point on the C. & O. near Logan to Holden, 5.43 miles, and also has various branches totaling 10.23 miles, all in Logan County, W. Va. It serves a coal area in which it is estimated that there is a supply of between 700,000,000 and 800,000,000 tons of coal and practically all of its traffic is in that commodity.

Commissioner Eastman dissented in both decisions on the ground that what was proposed was an acquisition of control involving a consolidation of the carriers into a single system for ownership and operation that the commission is without authority to approve under paragraph 2 of section 5 of the Transportation Act. He added in the case of the Island Creek that he thought the price to be paid for the stock, namely \$1,500,000 for 4,000 shares, was too high.

New Directors.—George Cole Scott, John Steward Bryan and J. A. Dart, representing minority stockholders were elected directors at the annual meeting at Richmond, on April 20, in accordance with previous announcement that this action was to be taken.

CHICAGO & NORTH WESTERN.—1925 Earnings.—Annual report for 1925 shows net income after interest and other charges of \$10,784,578 equivalent after allowance for preferred dividends to \$6.34 a share on the common stock. Net income in 1924 was \$7,671,324 or \$4.20 a share on the common. See excerpts from annual report on adjoining pages.

CHICAGO & NORTH WESTERN.—Bond Sold.—Kuhn, Loeb & Co. and the National City Company have sold at 102½ to yield 4½ per cent due to maturity, \$18,632,000 general mortgage 4¾ per cent bonds due November 1, 1987. Details of the issue are given as follows:

These bonds will be issued under the general mortgage of the company, executed in 1897, authorizing the issuance from time to time of bonds not to exceed \$165,000,000 principal amount, bearing interest at the rate of not to exceed 5 per cent per annum, and providing for the retirement at or before maturity of the prior liens and debentures then outstanding, and for the further improvement of the property. The bonds are not redeemable before maturity.

The present issue of bonds is being sold to provide funds for the retirement, on August 15, 1926, of \$18,632,000 principal amount of Chicago & North Western extension 4 per cent gold bonds.

The general mortgage bonds, upon retirement of the bonds due August 15, 1926, above mentioned, will be secured by a first lien on 3,469 miles of road and subject to \$20,757,000 prior liens (for which bonds of this issue are reserved) on an additional 1,623 miles of road. This first lien mileage includes the entire double track main line of the company from Chicago to Council Bluffs, Iowa; its main line to Elroy, Wis., forming with the main line of the Chicago, St. Paul, Minneapolis & Omaha, a main line from Chicago to Minneapolis, St. Paul and Duluth; its main line through southern Minnesota and into South Dakota; the main line from Chicago to Milwaukee, and its main lines from Milwaukee to Ashland on Lake Superior and from Milwaukee through Green Bay to northern Michigan points. Upon retirement of the above mentioned extension 4 per cent bonds, the general mortgage

bonds, including those pledged, together with the prior lien debts for which general mortgage bonds are reserved, will be outstanding at the rate of only \$30,560 per mile of road subject to the general mortgage. The general mortgage bonds are also secured by a first lien on the Chicago terminal properties of the company.

Of the authorized amount of general mortgage bonds there will be outstanding, after the present issue, \$114,357,000 bonds, of which \$31,316,000 are 3½ per cent bonds, \$30,554,000 are 4 per cent bonds, \$18,632,000 are 4¾ per cent bonds, and \$33,855,000 are 5 per cent bonds. In addition there are pledged as part collateral for the company's secured bonds, due in 1930 and 1936, \$20,500,000 of 5 per cent general mortgage bonds. Of the balance of the authorized amount, \$20,757,000 are reserved to retire prior liens and debentures due in 1929 and 1933, \$5,031,000 bonds are unissued in the treasury of the company, and \$4,355,000 bonds are reserved to assist in refunding, or for improvements or additions, including equipment.

CHICAGO & WESTERN INDIANA.—1925 Earnings.—Annual report for 1925 shows net income of \$865,001 as compared with \$712,374 in 1924. Selected items from the income statement follow:

CHICAGO & WESTERN INDIANA			
	1925	1924	Increase or decrease
Railway operating revenues.....	\$376,381	\$374,533	\$1,848
Total operating expenses.....	\$416,805	\$437,157	—\$20,353
Operating ratio.....	110.74	116.72	—5.98
Net loss from operations.....	\$40,423	\$62,624	—\$22,201
Joint facility rent income.....	\$2,702,056	\$2,472,343	\$229,712
Rent from lease of road.....	2,281,698	1,951,764	329,935
Total non-operating income.....	\$5,172,586	\$4,665,586	\$507,000
Gross income.....	\$5,132,163	\$4,602,961	\$529,201
Railway tax accruals.....	672,841	735,706	—62,865
Interest on funded debt.....	3,382,837	2,975,333	407,504
Total deductions from gross income..	\$4,267,162	\$3,890,587	\$376,575
Net income.....	\$865,001	\$712,375	\$152,626

CHICAGO GREAT WESTERN.—1925 Earnings.—The annual report for 1925 shows net income after interest and other charges of \$628,920 equivalent to \$1.32 a share on the outstanding preferred stock. Net income in 1924 was \$601,558 or \$1.28 a share on the preferred. Selected items from the income statement follow:

CHICAGO GREAT WESTERN			
	1925	1924	Increase or decrease
Average mileage operated.....	1,496.06	1,496.06	.....
Railway operating revenues.....	24,502,760	24,726,678	—223,918
Maintenance of way.....	3,442,378	3,682,233	—239,855
Maintenance of equipment.....	4,849,979	4,726,280	123,699
Transportation.....	9,803,838	10,228,278	—424,440
Total operating expenses.....	19,812,718	20,238,411	—425,692
Operating ratio.....	80.86	81.84	—.98
Net revenue from operations.....	4,690,042	4,488,268	201,775
Railway tax accruals.....	1,000,263	945,933	54,330
Railway operating income.....	3,685,931	3,538,480	147,450
Equipment rents—net dr.....	701,535	462,731	238,803
Joint facility rents—net dr.....	896,483	841,703	54,780
Net railway operating income.....	2,087,913	2,234,046	—146,133
Non-operating income.....	358,844	174,641	184,203
Gross income.....	2,446,757	2,408,687	38,070
Interest on funded debt.....	1,709,840	1,714,325	—4,485
Total deductions from gross income..	1,817,836	1,807,129	10,707
Net income.....	628,920	601,558	27,362

CHICAGO, MILWAUKEE & ST. PAUL.—Investigation Continues.—The investigation of the Interstate Commerce Commission of the affairs of the Chicago, Milwaukee & St. Paul was resumed on Wednesday before Commissioner Cox in the assembly room of the Metropolitan Life Insurance Company, 1 Madison avenue, New York. John D. Ryan, chairman of the board of directors of the Anaconda Copper Company and formerly a director of the railroad was again on the stand and was questioned at length concerning the contracts made by the railway company and the power companies in which he was interested. The question of the rates paid for power and other details were explained at length. Mr. Ryan denied that he had ever acted on behalf of his power interest in detriment to the railroad.

CHICAGO, ROCK ISLAND & PACIFIC.—Interlocking Directors Authorized.—Edward N. Brown, James M. Kurn and Jesse Hirschman, directors of the St. Louis-San Francisco, have been authorized by the Interstate Commerce Commission to serve also as directors of this company, of which the Frisco has purchased about 14 per cent of the capital stock outstanding. In its report, to which Commissioner Eastman dissented, Division 4 said in part:

While it is expected by the applicants that authority for the unification of the properties of the two companies in some form will be sought eventually under the provisions of paragraph (2) of section 5 of the act, we are not now faced by any such plan. The applicants will constitute a small minority of the Rock Island board. The record supports a finding that the granting of the applications will not affect adversely either public or private interests within the meaning of paragraph (12) of section 20a. The applications will, therefore, be granted by appropriate order. This action, however, is taken without prejudice to any findings that may be justified by subsequent proceedings involving the relations of the Frisco and the Rock Island, or the relations of either of these carriers to other carriers, in the administration of the provisions of section 5 of the act. If at any future time it should be shown that the exercise of the authority granted is affecting adversely either public or private interests, an appropriate order may be entered to meet the situation then presented.

The applicants had been elected to fill, subject to the commission's approval. The application of Edward N. Brown recited that, if approved by the commission, he would be made chairman of the executive committee of the Rock Island.

CHICAGO, ROCK ISLAND & PACIFIC.—1925 Earnings.—The annual report for 1925 shows net income after interest and other charges of \$6,966,132 equivalent after allowance for dividends on the preferred stocks to \$4.54 a share on the common. Net earnings in 1924 were \$6,835,221 or \$4.36 a share. Selected items from the income statement follow:

CHICAGO, ROCK ISLAND & PACIFIC			
	1925	1924	Increase or decrease
Average mileage operated.....	8,022	8,073	—51
Railway operating revenues....	\$130,683,246	\$130,880,512	—\$197,266
Maintenance of way.....	\$15,622,835	\$15,086,589	\$536,247
Maintenance of equipment.....	28,271,705	27,937,080	334,625
Transportation.....	49,868,630	51,781,162	—1,912,532
Total operating expenses.....	\$100,769,486	\$101,206,546	—\$437,060
Operating ratio.....	77.17	77.33	—.16
Net revenue from operations.....	\$29,913,760	\$29,673,966	\$239,794
Railway tax accruals.....	7,037,771	6,571,087	466,684
Railway operating income.....	\$22,799,945	\$23,046,156	—\$246,211
Other income.....	\$2,077,943	\$1,486,473	\$591,470
Total income.....	\$24,877,888	\$24,532,629	\$345,259
Hire of freight cars—Dr. bal....	\$3,328,423	\$3,758,492	—\$430,069
Joint facility rents—Dr. bal....	1,985,554	1,904,401	81,153
Total.....	\$6,050,549	\$6,666,613	—\$616,063
Available for interest.....	\$18,827,339	\$17,866,017	\$961,322
Interest charges.....	\$11,861,206	\$11,030,796	\$830,411
Net income.....	\$6,966,132	\$6,835,221	\$130,911
Dividends on 7 per cent preferred	\$2,059,547	\$2,059,547	.....
Dividends on 6 per cent preferred	1,507,638	1,507,638	.....
Surplus for year carried to profit and loss.....	\$3,398,947	\$3,268,036	\$130,911

COLFAX NORTHERN.—Abandonment.—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon the operation of its line from Colfax, Ia., to Mine No. 9 of the Colfax Consolidated Coal Company, 5.93 miles. It was shown in the record that the operations of the mine in question had been concluded. From time to time in the past various portions of the Colfax Northern had been abandoned. This is the last section of the railroad to be continued in operation.

DENVER & RIO GRANDE WESTERN.—Equipment Trust Certificates.—The Interstate Commerce Commission has approved the issuance of \$1,725,000 5 per cent equipment trust certificates, series B, to be dated March 1, 1926, and to mature in equal annual instalments on March 1, 1927 to 1941. The certificates are to be sold to Kuhn, Loeb & Co. and the Blair & Co., Inc., at 99¼. The equipment includes 10 locomotives and 700 freight cars, having a total approximate cost of \$2,304,665.

DENVER & SALT LAKE.—Hearing on Unsecured Claims.—A hearing in the district court at Brighton, Colo., was begun on April 10 before Judge Samuel W. Johnson on the report of Referee Harry S. Class on the classification of unsecured claims against the Denver & Salt Lake, amounting to approximately \$500,000.

DENVER & RIO GRANDE WESTERN.—1925 Earnings.—Annual report for 1925 shows net income of \$2,562,986 equivalent after allowance for fixed interest charges and sinking fund requirements to 9.6 per cent on the \$29,808,000 general mortgage sinking fund bonds upon which directors recently decided to defer interest. After allowance for 5 per cent interest on these bonds the balance would have been equivalent to 13.6 per cent on the preferred stock.

In 1924 the company reported a deficit of \$1,713,252. Selected items from the income statement follow:

DENVER & RIO GRAND WESTERN			
	1925	1924	Increase or decrease
Average mileage operated.....	2,570.59	2,600.30	-29.71
Railway operating revenues.....	\$33,629,463	\$33,011,558	\$617,906
Maintenance of way.....	\$5,742,197	\$6,128,433	\$386,236
Maintenance of equipment.....	5,948,303	9,151,008	-3,202,705
Transportation	10,835,670	11,378,447	-542,777
Total operating expenses.....	\$24,794,249	\$28,591,457	-\$3,797,208
Operating ratio.....	73.73	86.61	-12.88
Net revenue from operations....	\$8,835,215	\$4,420,101	\$4,415,113
Railway tax accruals.....	2,316,092	1,986,336	329,756
Railway operating income.....	\$6,511,738	\$2,423,929	\$4,087,809
Equipment rents.....	Dr. \$27,789	Cr. \$100,376	-\$128,164
Joint facility rents—Cr.....	274,835	260,779	14,056
Net railway operating income....	\$6,758,785	\$2,785,083	\$3,973,701

Gross income	\$6,938,219	\$2,921,693	\$4,016,526
Available for interest.....	\$6,780,296	\$2,711,238	\$4,069,058
Total interest.....	4,217,310	4,424,490	-207,180
Net income.....	\$2,562,986	Def. \$1,713,252	\$4,276,238

DETROIT & IRLINGTON.—*Further Hearing Denied.*—The Interstate Commerce Commission has denied a petition of minority stockholders of the Detroit, Toledo & Ironton for further hearing and a subpoena for the testimony of Henry Ford, on this company's application for authority to acquire control of the D. T. & I.

FAIRCHILD & NORTHEASTERN.—*Abandonment.*—A proposed report by Examiner Weed recommends a finding by the commission that public convenience and necessity permit the abandonment by this company of its line from Cleghorn, Wis., to Fairchild, 27 miles. The company had asked authority to abandon its entire line from Fairchild to Owen, 65 miles.

(Continued on page 1188)

Annual Reports

Seventy-Sixth Annual Report of the Illinois Central Railroad Company for the Year Ended December 31, 1925

Report of the Board of Directors

To the Stockholders of the Illinois Central Railroad Company:

The Board of Directors submits the following report of the operations and affairs of the Illinois Central Railroad Company for the year ended December 31, 1925, including The Yazoo & Mississippi Valley Railroad Company, the entire capital stock of which is owned or controlled by the Illinois Central Railroad Company. For convenience the two companies are designated by the term "Illinois Central System."

The number of miles of road operated as of December 31, 1924, was. 6,243.21

Less:

Various changes due to remeasurements, etc..... .43

The number of miles operated as of December 31, 1925, was..... 6,242.78

The average number of miles of road operated during the year was.. 6,243.25

Income

A summary of the income for the year ended December 31, 1925, as compared with the previous year is stated below.

	1925	1924	INCREASE + DECREASE—
Average miles operated during year.....	6,243.25	6,218.06	+ 25.19
Railway operating revenues (Table 2).....	\$178,169,625.41	\$173,838,131.99	+\$4,331,493.42
Railway operating expenses (Table 10).....	135,382,526.64	134,024,920.62	+ 1,357,606.02
Net revenue from railway operations.....	42,787,098.77	39,813,211.37	+ 2,973,887.40
Railway tax accruals.....	12,729,951.31	12,722,492.69	+ 7,458.62
Uncollectible railway revenues	38,344.56	56,902.49	— 18,557.93
Railway operating income	30,018,802.90	27,033,816.19	+ 2,984,986.71
Equipment rents—net debit	618,891.32	Cr. 613,235.64	+ 1,232,126.96
Joint facility rent—net credit	527,031.61	455,021.62	+ 72,009.99
Net railway operating income	29,926,943.19	28,102,073.45	+ 1,824,869.74
Nonoperating income.....	3,623,813.37	3,577,826.06	+ 45,987.31
Gross income.....	33,550,756.56	31,679,899.51	+ 1,870,857.05
Deductions from gross income	15,999,013.90	15,431,341.96	+ 567,671.94
Net income.....	17,551,742.66	16,248,557.55	+ 1,303,185.11
Disposition of net income:			
Income appropriated for investment in physical property		36,390.10	— 36,390.10
Total appropriations of income		36,390.10	— 36,390.10
Income balance transferred to credit of profit and loss	17,551,742.66	16,212,167.45	+ 1,339,575.21

Railway Operating Revenues

"Railway Operating Revenues" amounted to \$178,169,625.41 this year, as compared with \$173,838,131.99 last year, an increase of \$4,331,493.42, or 2.49 per cent. For details of "Railway Operating Revenues" see Table 2.

"Freight Revenue" increased \$4,998,799.38, or 3.78 per cent. There was a substantial increase in the volume of business transported. No changes of major importance were made in freight rates during the year. Tons of revenue freight carried one mile were 14,891,944,844, an increase of 607,232,374 ton miles, or 4.25 per cent, over the previous year. The average rate per ton per mile was .921 cent, a decrease of .004 cent, or 0.43 per cent, compared with the previous year.

"Passenger Revenue" decreased \$921,651.18, or 3.16 per cent. The number of passengers carried one mile was 968,056,893, a decrease of 4,010,187, or 0.41 per cent, compared with last year. The average revenue per passenger per mile decreased .083 cent, or 2.77 per cent. There were increases in long-distance and commutation passenger travel which were more than offset by the decrease in local travel, due largely to increased use of private passenger automobiles.

"Mail Revenue" increased \$62,031.17, or 2.48 per cent, due to increased service rendered this year, as compared with the previous year.

"Express Revenue" decrease \$145,417.25, or 3.47 per cent, due in part to a decrease in express traffic this year, as compared with last year, and in part to the inclusion in last year's revenue of amounts received from the American Railway Express Company covering adjustments of prior years.

The increase of \$23,455.47, or 1.74 per cent, in other passenger revenues, consisting of "Excess Baggage," "Parlor and Chair Car," "Milk" and "Other Passenger-Train Revenue," was accounted for by increase in revenues from operations of parlor and chair cars, increase in the amount received from The Pullman Company for operating sleeping cars over system lines, and increase in the volume of newspapers handled on passenger trains; these increases were partly offset by decreased revenues from excess baggage and the transportation of milk. The falling off in milk transportation was due to motor truck competition.

The increase of \$39,715.33, or 1.89 per cent, in "Switching" and "Special Service Train Revenues," was due to increased business.

"Incidental" and "Joint Facility Revenues" increased \$274,560.50, or 11.39 per cent, due in part to an increase in dining car service this year over the previous year and in part to the general improvement in business.

Railway Operating Expenses

"Railway Operating Expenses" amounted to \$135,382,526.64, as compared with \$134,024,920.62 in the previous year, an increase of \$1,357,606.02, or 1.01 per cent. For details of "Railway Operating Expenses" see Table 10.

There was an increase of \$2,434,888.02, or 10.18 per cent, in "Maintenance of Way and Structures Expenses," due to increased outlays for track repairs and upkeep of station and other buildings, interlocking plants and block signals, also to the inclusion in the previous year's figures of a credit adjustment in connection with maintenance reserves.

The decrease of \$701,952.89, or 1.78 per cent, in "Maintenance of Equipment Expenses" was by reason of decreased expenditures for repairs to locomotives and freight-train cars, offset in part by increases in charges for equipment retired and additional charges

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for depreciation, the latter due to additional equipment placed in service.

The increase in "Traffic Expenses" of \$268,874.90 was due to increased outlays for superintendence, outside soliciting agencies, advertising and printing of tariffs.

There was a decrease of \$927,932.76, or 1.46 per cent, in "Transportation Expenses," due largely to a decrease in the cost and consumption of fuel. This saving in fuel expenses was offset in part by a moderate increase in other transportation expenses by reason of the increased volume of traffic handled this year, as compared with the previous year.

The increase of \$127,844.20, or 10.75 per cent, in "Miscellaneous Operations" was on account of additional dining car service in operation during the year.

"General Expenses" increase \$122,520.42, or 2.83 per cent.

The increase in expenses by reason of the decrease of \$33,364.13 in "Transportation for Investment—Credit" was due to a decrease in service rendered in connection with the construction work carried on during the year.

Railway Tax Accruals

"Railway Tax Accruals" were \$12,729,951.31 this year, as compared with \$12,722,492.69 last year, an increase of \$7,458.62, or 0.06 per cent.

Uncollectible Railway Revenues

"Uncollectible Railway Revenues" were \$38,344.56 this year and \$56,902.49 last year, a decrease of \$18,557.93.

Equipment Rents—Net Debit

"Equipment Rents—Net Debit" amounted to \$618,891.32 this year, compared with a credit of \$613,235.64 in the previous year, an increase of \$1,232,126.96, substantially all of which covered increased payments for the use of foreign equipment, especially private tank cars, due to an increase in traffic received from connecting lines.

Joint Facility Rent—Net Credit

"Joint Facility Rent—Net Credit" amounted to \$527,031.61 this year, as against \$455,021.62 last year, an increase of \$72,009.99.

Nonoperating Income

"Nonoperating Income" this year amounted to \$3,623,813.37, as compared with \$3,577,826.06 last year, an increase of \$45,987.31. There was an increase in "Income from Funded Securities" of \$153,580.81, substantially all of which was for interest from government securities, representing the temporary investment of funds derived from the sale of securities during the war. Other items contributing to the increase were an increase in "Miscellaneous Nonoperating Physical Property" of \$22,286.17 and an increase in "Income from Capital Advances to Affiliated Companies" of \$42,857.80. Offsetting these increases in part were decreases in "Income from Lease of Road" of \$818.40; in "Miscellaneous Rent Income" of \$110,921.73, largely due to a readjustment of the rentals of elevators at New Orleans heretofore reported in "Deductions from Gross Income" as "Separately Operated Properties—Loss"; in "Income from Unfunded Securities and Accounts" of \$36,665.77, made up largely of decreased interest on deposits with banks; and in "Miscellaneous Income" of \$24,331.57, practically all of which was due to a falling off in profits on sterling exchange, as a result of the rise in sterling exchange substantially to par.

Deductions From Gross Income

"Deductions from Gross Income" amounted to \$15,999,013.90 this year, as against \$15,431,341.96 last year, an increase of \$567,671.94. There was an increase in "Interest on Funded Debt" of \$686,827.93 due to the inclusion of interest during the entire year on securities issued last year, and, in addition, interest for portions of the year on securities issued during the current year, less interest on Equipment Trusts retired, as compared with a part year's interest on securities issued during the previous year, a comparison of which may be made by reference to Table 7 in the report this year, and the corresponding table for the previous year; an increase of \$32,574.61 in "Amortization of Discount on Funded Debt" due to the inclusion of the prorata of discount and expenses on securities issued during the year; an increase of \$11,670.83 in "Rent for Leased Roads" due to increased rental payments to the Dubuque & Sioux City Railroad Company; and other minor increases aggregating \$2,186.61. These increases were offset in part by decreases in "Separately Operated Properties—Loss" of \$97,571.75, largely due to a reduction in the loss from operating elevators at New Orleans; in "Interest on Unfunded Debt" of \$66,633.38 due to decreases in interest on loans and on deposits account of subscriptions for Preferred Stock issued in the previous year; and in other minor decreases aggregating \$1,382.91.

Financial

The General Balance Sheet, reflects the financial condition of the Illinois Central System Companies on December 31, 1925, as compared with the previous year.

Capital Stock and Funded Debt

The Board of Directors of the Illinois Central Railroad Company, at a meeting held September 29, 1925, passed a resolution extending to common stockholders of record October 22, 1925, the right to subscribe at par to an additional issue of Six Per Cent Convertible Preferred Stock, Series "A," to the extent of ten per cent of their holdings of common shares, payments to be made on or before December 10, 1925. The amount so authorized was \$12,263,100.00, of which \$11,933,700.00 par value of preferred stock was issued and sold, leaving \$329,400.00 par value available for future sale. Preferred stock of the par value of \$3,736,700.00 was converted into common stock during the year. There were issued and sold during the year \$357,900.00 of common stock, representing the balance of the shares not subscribed for by stockholders under the authorization of October 7, 1924. There were also issued and sold fourteen shares of preferred stock against Illinois Central Scrip Receipts of 1924 remaining unconverted at February 1, 1925, the date fixed as the expiration of the privilege to convert Fractional Scrip as authorized by the Board Resolution of October 10, 1923. The full paid Scrip amounting to \$1,480.00 against which these shares have been issued has been eliminated from Capital Stock account and is being retired at par as presented by the holders. Receipts to the amount of \$3,300.00 par value were converted into Preferred Stock, Series "A," during the year.

Illinois Central Equipment Trust Certificates, Series "L," in the amount of \$9,240,000.00 were issued and sold in December, 1925.

Under the terms of the Illinois Central Railroad Company and Chicago, St. Louis & New Orleans Railroad Company Joint First Refunding Mortgage, there were issued in June, 1925, \$7,094,000.00 Five Per Cent Bonds, Series "A," in reimbursement for improvements made to the mortgaged property. These bonds were sold in June, 1925. Under the terms of the Mortgage \$32,000.00 par value of Series "A," or Dollar Bonds, were issued in exchange for \$6,400 Sterling Bonds, the equivalent of \$31,040.00 of Series "B," or Sterling Bonds, upon payment of the difference of \$960.00 in cash.

There were retired and canceled under the terms of the respective trust agreements Illinois Central Equipment Trust Certificates, Series "C," \$99,000.00; Series "D," \$190,000.00; Series "E," \$550,000.00; Series "F," \$737,000.00; Series "H," \$217,000.00; Series "I," \$443,000.00; Series "K," \$863,000.00; Government Equipment Trust No. 33, \$647,100.00, and under the equipment contract with The Pullman Company, \$155,771.68, a total of \$3,901,871.68.

Securities Owned

During the year there was purchased for temporary investment \$5,000,000.00 par value United States Second Liberty Loan Four and One-quarter Per Cent Bonds of 1927-1942.

The Peoria and Pekin Union Railway Company redeemed \$15,000.00 par value of its Five Per Cent Debenture Bonds maturing November 1, 1925.

New Line—Edgewood, Illinois, to Fulton, Kentucky

The construction of a new line of railroad from Edgewood, Illinois, to Fulton, Kentucky, a distance of one hundred sixty-three miles, together with a branch line from West Frankfort Junction, Illinois, to Akin Junction, Illinois, a distance of seven miles, was actively undertaken during the year. The line south of the Ohio River is being constructed by the Chicago, St. Louis & New Orleans Railroad Company, and the line north of the Ohio River is under construction by the Southern Illinois & Kentucky Railroad Company, the capital stock of which companies is owned by your company. The primary object is to provide a low-grade line that will more economically handle the north and south-bound traffic, thereby relieving the growing congestion over the Cairo Bridge and the lines immediately north and south thereof. The maximum grade on the new line, as a whole, will be three-tenths of one per cent. During the year sixty-nine per cent of the grading of the line north of the Ohio River was completed, and south of the river approximately eighty-one per cent of the grading was completed.

Additions and Betterments—Expenditures:

There was expended during the year for "Additions and Betterments" (including improvements on subsidiary properties) \$39,300,379.32. The following is a classified statement of these expenditures:

	TOTAL EXPENDED
Engineering	\$1,461,750.01
Land for transportation purposes.....	1,782,390.13
Grading	8,295,723.49
Tunnels and subways.....	455,778.29
Bridges, trestles and culverts.....	3,912,781.71
Ties	392,935.92
Rails	679,843.50
Other track material.....	1,347,774.50
Ballast	948,435.31
Track laying and surfacing.....	759,299.02
Right of way fences.....	9,724.73
Snow and sand fences and snowsheds.....	Cr. 250.02
Crossings and signs.....	1,008,663.92
Station and office buildings.....	1,339,315.58
Roadway buildings	69,444.71
Water stations.....	313,780.32

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	TOTAL EXPENDED
Fuel stations.....	338,884.90
Shops and enginehouses.....	3,092,167.39
Grain elevators.....	Cr. 7,492.01
Wharves and docks.....	Cr. 54,294.68
Telegraph and telephone lines.....	377,468.59
Signals and interlockers.....	952,439.52
Power plant buildings.....	7,872.14
Power substation buildings.....	Cr. 249.83
Power transmission systems.....	20,568.36
Power distribution systems.....	262,285.47
Power line poles and fixtures.....	373,597.07
Underground conduits.....	8,105.37
Miscellaneous structures.....	88,652.98
Paving.....	Cr. 1,823.71
Roadway machines.....	95,894.61
Roadway small tools.....	Cr. 170.75
Assessments for public improvements.....	218,655.41
Revenues and operating expenses during construction.....	Cr. 25,377.33
Other expenditures—Road.....	903.58
Shop machinery.....	975,190.76
Power plant machinery.....	21,882.61
Power substation apparatus.....	776.31
Unapplied construction material and supplies.....	291,546.59
TOTAL.....	\$29,814,674.56
EQUIPMENT:	
Steam locomotives.....	\$1,780,631.26
Other locomotives.....	2,034.04
Freight train cars.....	4,619,597.00
Passenger train cars.....	2,524,298.61
Motor equipment of cars.....	279.17
Floating equipment.....	361.54
Work equipment.....	123,466.98
Miscellaneous equipment.....	23,713.63
TOTAL.....	\$9,072,382.23
GENERAL:	
Organization expenses.....	\$464.20
General officers and clerks.....	27,041.62
Law.....	1,122.30
Stationery and printing.....	551.45
Interest during construction.....	384,142.90
TOTAL.....	\$413,322.53
GRAND TOTAL.....	\$39,300,379.32

The above statement includes \$15,047,005.38 advanced, during the year, for additions and betterments to the properties of subsidiary companies as follows:

Batesville Southwestern R. R. Co.....	Cr. \$2,919.63
Baton Rouge, Hammond & Eastern R. R. Co.....	58,230.05
Benton Southern R. R. Co.....	141,641.82
Blue Island R. R. Co.....	73,795.69
Canton, Aberdeen and Nashville R. R. Co.....	71,726.90
Chicago, St. Louis & New Orleans R. R. Co.....	6,222,128.71
Chicago, Memphis & Gulf R. R. Co.....	9,041.17
Dubuque and Sioux City R. R. Co.....	1,125,820.29
Golconda Northern Ry.....	Cr. 1,388.51
Kensington and Eastern R. R. Co.....	1,567.50
Memphis Railroad Terminal Co.....	Cr. 3,000.00
South Chicago R. R. Co.....	193,534.93
Southern Illinois and Kentucky R. R. Co.....	7,156,826.46
TOTAL.....	\$15,047,005.38

Physical Changes

The following is a summary of the more important improvements during the year, the cost of which was charged, wholly or in part, to "Road and Equipment":

Additions and Betterments—Road:

Progress was made on Chicago terminal improvement work. Subway under Michigan Avenue at Van Buren Street, bridge over Calumet River and freight house at Harvey, Ill., were completed. Freight yard of 300 cars capacity was constructed near 31st Street. Six suburban stations on the main line and four on the South Chicago branch were rearranged and improved. Markham Yard, near Homewood, Ill., was nearly completed. Two additional tracks were constructed between 8th and 31st Streets and their extension to 51st Street begun. Underground conduit system for telegraph and telephone lines was completed between 26th and 44th Streets and its extension is in progress. Separation of grades with the Pennsylvania Railroad and the Baltimore & Ohio Chicago Terminal Railroad at Riverdale, Ill., track elevation through Harvey, Ill., and filling of submerged lands were continued. Separation of grades with the South Chicago branch, near 67th Street, and with the Chicago & Western Indiana Railroad and Chicago, Rock Island and Pacific Railway, at 94th Street, was commenced. Work on overhead catenary system for suburban electrification was continued; on the main line eighty-seven per cent of foundations has been laid, fifty-seven per cent of the steel structures erected and twenty-three per cent of the catenary system installed. On the South Chicago branch all foundations were completed and eighty per cent of the steel structures erected. On the Blue Island branch all foundations were completed and ninety-five per cent of the steel structures erected.

Three hundred sixty-one Company sidings, covering 39.28 miles of track, and 184 industrial sidings were built or extended.

The construction of second track, Wilderman Junction, Ill., to Layfield, Ill., a distance of 39.47 miles, referred to in the previous report, was completed.

Elevation of tracks at Jackson, Miss., is now in progress, and

permanent subways are being constructed at Gallatin, Monument, Capitol and Pearl Streets, and over the Alabama and Vicksburg Railway.

Extensive alterations and improvements were made to yard facilities at East St. Louis, Ill., including the installation of a three section mechanical hump and a seventy-two foot 150-ton plate fulcrum scale. The work of equipping the hump with electrically controlled car retarders was started and practically completed during the year.

Extensive improvements were made to the freight station at Springfield, Ill. A new freight house was constructed at Madisonville, Ky., and the construction of new freight house at Indianapolis, Ind., referred to in the previous report, was completed.

New passenger and freight stations were constructed at Griffin, Ind., New Athens, Ill., Peosta, Iowa, and Onward, Miss., and extensive alterations were made at Grenada, Miss. The work of constructing new passenger station facilities at Berwyn, Ill., DeSoto, Ill., and Hazlehurst, Miss., is in progress. Improvements were made to passenger station facilities at Central City, Ky., including the installation of a baggage elevator.

New mechanical facilities were constructed at Sioux City, Iowa, and the construction of new shop facilities at Paducah, Ky., is in progress. Improvements were made to mechanical facilities at Natchez, Miss.

The construction of a coal chute at Dawson Springs, Ky., referred to in the previous report, was completed.

Creosoted water tanks of 100,000-gallon capacity were erected at DuQuoin, Ill., Fort Dodge, Iowa, Sioux City, Iowa, Cecilia, Ky., and Blackford, Ky., and the work of erecting a similar tank at Anna, Ill., is in progress. A water treating plant of 20,000-gallon capacity per hour was constructed at Sioux City, Iowa, together with a 100,000-gallon steel water tank.

The installation of automatic train control between Champaign, Ill., and Branch Junction, Ill., referred to in the previous report, was completed, and a similar installation is in progress between Waterloo, Iowa, and Fort Dodge, Iowa, a distance of 96.1 miles.

One thousand eight hundred ninety-seven lineal feet of permanent bridges and trestles were constructed, replacing pile and timber bridges and trestles; 1,983 lineal feet of permanent bridges and trestles and 18,619 lineal feet of pile and timber bridges and trestles were rebuilt.

Additions and Betterments—Equipment:

Twenty-five Mountain type passenger locomotives were added. One Consolidation type freight, five Mogul type freight, three 10-wheel type freight, two 8-wheel type passenger and eight 6-wheel type switch locomotives were retired. Twenty-five locomotives of various types were superheated. The increase in tractive power of locomotives for the year was 910,801 pounds.

Two hundred sixty-six passenger cars were added and twenty-five passenger cars were retired or transferred to other classes, resulting in a net increase of 241 cars.

Six thousand two hundred seventy-one freight cars were added and 9,267 cars were retired or transferred to other classes, resulting in a net decrease of 2,996 cars.

General Remarks

There was a substantial improvement in business conditions in the territory served by your lines of railroad during the year, particularly in the South. The immediate factors contributing to the increased volume of business in the South were a large cotton crop disposed of at advantageous prices and a heavy increase in the volume of crude petroleum shipments. However, another and more lasting factor, has been the growing appreciation in recent years of the latent possibilities and resources of the Southern states that has resulted in a steadily increasing flow of outside capital into the industrial and agricultural development of this section of the country. The growth of the South in this respect in the last several years augurs well for the future, both for the communities distributed throughout this territory and for your company, whose interests are inseparably linked therewith.

The Interstate Commerce Commission in an order dated June 1, 1925, formally approved the acquisition of the capital stock of the Gulf and Ship Island Railroad Company. The purchase of the capital stock was effected July 2, 1925, and your company assumed active control of the property on that date. The railroad is being separately operated.

The application to the Interstate Commerce Commission for approval to lease the Alabama and Vicksburg, and Vicksburg, Shreveport & Pacific railways was under advisement by the Interstate Commerce Commission at the close of the year.

The number of stockholders of record at the close of the year was 24,352, of whom 15,731 were holders of common shares and 8,621 were holders of preferred shares. There were 21,804 stockholders at the close of the previous year.

The Board of Directors takes pleasure in expressing its appreciation to the officers and employees for their loyal and efficient services.

By order of the Board of Directors.

C. H. MARKHAM,
President.

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Sixty-Sixth Annual Report of the Chicago and North Western Railway Company, Year Ending December 31, 1925

REPORT OF THE BOARD OF DIRECTORS

To the Stockholders of the Chicago and North Western Railway Company:

The Board of Directors submits herewith its report of the operations and affairs of the Company for the year ending December 31, 1925.

Average mileage of road operated, 8,467.56.

OPERATING REVENUES:	
Freight	\$104,888,463.38
Passenger	26,769,125.98
Other Transportation	13,872,945.75
Incidental	3,007,734.02
	<hr/> \$148,538,269.13
OPERATING EXPENSES:	
Maintenance of Way and Structures	\$20,988,336.60
Per Cent. of Operating Revenues	14.13
Maintenance of Equipment	30,613,191.90
Per Cent. of Operating Revenues	20.61
Traffic	2,143,148.71
Per Cent. of Operating Revenues	1.44
Transportation	56,955,609.91
Per Cent. of Operating Revenues	38.34
Miscellaneous Operations	1,067,958.57
Per Cent. of Operating Revenues .....	.72
General	4,095,019.55
Per Cent. of Operating Revenues	2.76
Transportation for Investment—Cr	Cr.237,209.66
Per Cent. of Operating Revenues .....	.16
	<hr/> 115,626,055.58
Per Cent. of Operating Revenues	77.84
Net Revenue from Railway Operations, forwarded	<hr/> \$32,912,213.55
Railway Tax Accruals	\$10,004,224.15
Per Cent. of Operating Revenues	6.74
Uncollectible Railway Revenues	46,872.54
	<hr/> 10,051,096.69
Railway Operating Income	<hr/> \$22,861,116.86
Equipment and Joint Facility Rents—Net Debit	1,752,367.24
Net Railway Operating Income	<hr/> \$21,108,749.62
NON-OPERATING INCOME:	
Rental Income	\$694,685.21
Dividend Income	1,050,047.00
Income from Funded Securities	15,627.38
Income from Unfunded Securities and Accounts, and Other Items	555,886.90
	<hr/> 2,316,246.49
Gross Income	<hr/> \$23,424,996.11
DEDUCTIONS FROM GROSS INCOME:	
Rental Payments	\$41,681.04
Interest on Funded Debt	12,425,298.31
Other Deductions	173,438.74
	<hr/> 12,640,418.09
Net Income	<hr/> \$10,784,578.02
DIVIDENDS:	
7% on Preferred Stock	\$1,567,650.00
4% on Common Stock	5,806,100.00
	<hr/> 7,373,750.00
Balance Income for the Year	<hr/> \$3,410,828.02

General Remarks

During the year the Company added to its equipment 3,200 new steel underframe freight cars and 51 all steel passenger cars, as follows:

FREIGHT CARS—

1000 40-ton box cars.
1000 40-ton automobile cars.
500 50-ton flat cars.
500 40-ton stock cars.
200 40-ton refrigerator cars.
<hr/> 3200

PASSENGER CARS—

1 Gasoline-electric motor car.
24 Coaches.
23 Baggage cars.
3 Baggage and mail cars.
<hr/> 51

In addition to the foregoing, the following cars were rebuilt at the Company's shops:

FREIGHT CARS—

930 Box cars.
163 40-ft. automobile cars.
152 50-ft. automobile cars.
365 Refrigerator cars.
419 Gondola cars.
226 Stock cars.
<hr/> 2255

The above provides for the Company's service a total of 5,455 substantially new freight cars and 51 new passenger cars.

FREIGHT AND PASSENGER TRAFFIC

It will be observed from the data in this report that there was a substantial increase in freight revenues, but a larger decrease in passenger revenues, over the preceding year. Careful analysis of the cause for the passenger decrease has been made and it is interesting to know that the percentage of decrease is all in the short haul business in substantially the same ratio as the increase in registered motor vehicles in the States served by the Chicago and North Western Railway Company's lines.

OPERATING EXPENSES

It is gratifying to be able to report that transportation expenses decreased \$3,545,875.89 and that the ratio of those expenses to operating revenues has been reduced from 40.48% to 38.34%. Credit for this result is due to the operating officials and employees, all of whom have rendered most enthusiastic and loyal service throughout the year. These efforts will be continued in an intensive way, and it is hoped and believed that even better results will be produced during the year 1926.

TAXES

Special attention of stockholders is called to the growing burden of taxation. It will be observed that the tax accruals amounted to \$10,004,224.15 or 6.74% of operating revenues. In 1924 tax accruals were \$9,348,841.71 or 6.26% of operating revenues. It is hoped that the peak in taxation has been reached, and public authorities will from this time on co-operate with the railway managements to the end that this enormous burden upon the carriers, and therefore upon the rate structure, may be lessened.

Capital Stock

The Capital Stock authorized by the Company is Two Hundred Million Dollars (\$200,000,000.00), of which the following has been issued to December 31, 1925:

HELD BY THE PUBLIC:

Common Stock and Scrip	\$145,156,193.82
Preferred Stock and Scrip	22,395,120.00

Total Stock and Scrip held by the Public

HELD IN TREASURY:

Common Stock and Scrip	\$2,343,447.15
Preferred Stock and Scrip	3,834.56

Total Stock and Scrip held in Treasury

Total Capital Stock and Scrip, December 31, 1925

There was no change during the year in the Capital Stock and Scrip of the Company other than the purchase, by the Company, of \$70.00 Common Stock Scrip.

Funded Debt

At the close of the preceding year, the amount of Funded Debt held by the Public was

The above amount has been increased by Equipment Trust Certificates sold during the year ending December 31, 1925, as follows:

C. & N. W. Ry. Equipment Trust Certificates of 1923, 5% (secured by Series "O" and "P" equipment of the Equipment Trust of 1923):	
Series "O"	\$5,768,000.00
Series "P"	1,456,000.00

\$265,810,900.00

And the above amount has been decreased during the year ended December 31, 1925, by Bonds and Equipment Trust Certificates redeemed, as follows:

M. L. S. & W. Ry. First Mortgage (Ashland Division), 6%	\$1,000,000.00
M. L. S. & W. Ry. Extension & Improvement Sinking Fund Mortgage, 5%	46,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%	28,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%	112,000.00
C. & N. W. Ry. Equipment Gold Notes of 1920, 6% (including \$4,500.00 unrepresented and transferred to "Current Liabilities") ..	664,900.00
C. & N. W. Ry. Equipment Trust Certificates of 1920, 6½%:	
Series "J"	\$186,000.00
Series "K"	267,000.00
	<hr/>
	453,000.00

Forwarded

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C. & N. W. Ry. Equipment Trust Certificates of 1922, 5% (including \$1,000.00 Series "N" unrepresented and transferred to "Current Liabilities"):

Series "M" \$345,000.00
Series "N" 317,000.00

C. & N. W. Ry. Equipment Trust Certificates of 1923, 5%:
Series "O" 412,000.00

Total Funded Debt Redeemed 3,377,900.00

Leaving Funded Debt held by the Public, December 31, 1925 \$262,433,000.00

Bonds in the Treasury and Due from Trustee

At the close of the preceding year the amount of the Company's unpledged Bonds and Equipment Trust Certificates in the Treasury and Due from Trustee was \$20,546,000.00

The above amount has been increased during the year ending December 31, 1925, as follows:
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee, in exchange for bonds redeemed during the year 1,003,000.00

Other bonds redeemed during the year exchangeable for C. & N. W. Ry. General Mortgage Gold Bonds of 1987, viz.:

M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5% \$46,000.00
C. & N. W. Ry. Sinking Fund of 1897, 5% 28,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5% 112,000.00

C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee, on account of Construction Expenditures made during the year 1,000,000.00

C. & N. W. Ry. Equipment Trust Certificates of 1925, 4½%, Series "Q," issued 5,415,000.00

\$28,150,000.00

And the above amount has been decreased during the year ending December 31, 1925, as follows:

C. & N. W. Ry. Equipment Trust Certificates of 1913, 4½%, matured and canceled:
Series "E" \$485,000.00
Series "F" 115,000.00

C. & N. W. Ry. Equipment Trust Certificates of 1917, 5%, matured and canceled:
Series "G" 422,000.00
Series "H" 400,000.00
Series "I" 178,000.00

C. & N. W. Ry. Equipment Trust Certificates of 1920, 6½%, matured and canceled:
Series "L" 187,000.00

C. & N. W. Ry. Equipment Trust Certificates of 1923, 5%, matured and canceled:
Series "P" 104,000.00

Forwarded \$1,891,000.00 \$28,150,000.00

C. & N. W. Ry. Equipment Trust Certificates of 1923, 5% (secured by Series "O" and "P" equipment of the Equipment Trust of 1923), sold during the year:

Series "O" 5,768,000.00
Series "P" 1,456,000.00

9,115,000.00

Total Bonds in the Treasury and due from Trustee, December 31, 1925, unpledged \$19,035,000.00

The following bonds owned by the Company are pledged as security for the C. & N. W. Ry. 10-Year Secured Gold Bonds and C. & N. W. Ry. 15-Year Secured Gold Bonds:

C. & N. W. Ry. General Mortgage Gold of 1987, 5% \$20,500,000.00
C. & N. W. Ry. First and Refunding Mortgage, 6% 15,000,000.00

Total December 31, 1925, pledged \$35,500,000.00

Lands

During the year ending December 31, 1925, 34,371.54 acres and 2 town lots of the Company's Land Grant lands were sold for the total consideration of \$1,083,983.65. The number of acres remaining in the several Grants December 31, 1925, amounted to 169,377.12 acres, of which 3,238.30 acres were under contract for sale, leaving unsold 166,138.82 acres.

Appended hereto may be found statements, accounts and statistics relating to the business of the fiscal year and the condition of the Company's affairs on December 31, 1925.

The Board gratefully acknowledges its appreciation of the loyal and efficient services rendered by officers and employees during the year.

By order of the Board of Directors.

FRED W. SARGENT,
President.

Chicago, April 13, 1926.

Profit and Loss—December 31, 1925

Dr.

CHARGES FOR THE YEAR ENDING DECEMBER 31, 1925:

Depreciation accrued prior to July 1, 1907, on equipment retired or changed from one class to another \$526,400.72
Net loss on property sold or abandoned and not replaced 525,981.10
Debt discount incurred during the year extinguished through surplus 62,601.00

Credit Balance, December 31, 1925, carried to Balance Sheet. 62,031,847.15

\$63,146,829.97

Comparative General Balance Sheet

(8,395.33 Miles)

December 31, 1924	ASSETS	December 31, 1925	December 31, 1924	LIABILITIES	December 31, 1925
	INVESTMENTS			CAPITAL STOCK	
\$491,943,941.15	Investment in Road and Equipment.....	\$500,270,664.09	\$167,551,383.82	Held by Public.....	\$167,551,313.82
1,037,344.17	Miscellaneous Physical Property.....	986,435.92	2,347,211.71	Held in Treasury.....	2,347,281.71
2,585,262.02	Investment in Affiliated Companies.....	2,314,955.01		Total Capital Stock.....	\$169,898,595.53
10,337,152.29	Other Investments:		\$169,898,595.53	Premium Realized on Capital Stock.....	29,657.75
	Capital Stock of Chicago, St. Paul Minneapolis and Omaha Ry. Co. (149,200 Shares)	10,337,152.29	\$169,928,253.28	Total Capital Stock and Premium.....	\$169,928,253.28
3,910,575.93	Preferred Stock of Union Pacific Railroad Company (41,715 Shares).....	3,910,575.93		LONG TERM DEBT	
368,493.43	Miscellaneous	327,761.30	\$258,586,900.00	Funded Debt Held by the Public.....	\$262,433,000.00
\$510,182,768.99	Total Investments.....	\$518,147,544.54		Funded Debt Held in Treasury and Due from Trustee:	
	CURRENT ASSETS		20,546,000.00	Unpledged	19,035,000.00
\$12,678,992.47	Cash	\$16,190,318.01	35,500,000.00	Pledged	35,500,000.00
530,241.36	Loans and Bills Receivable.....	70,000.00	\$314,632,900.00	Total Long Term Debt.....	\$316,968,000.00
2,362,445.98	Traffic and Car Service Balances Receivable	773,249.40		CURRENT LIABILITIES	
3,772,392.59	Net Balance Receivable from Agents and Conductors	2,724,771.47	\$3,548,693.03	Traffic and Car Service Balances Payable.....	\$3,994,639.31
13,941,088.29	Miscellaneous Accounts Receivable.....	3,921,647.24	5,752,718.91	Audited Accounts and Wages Payable.....	5,909,876.71
449,502.46	Material and Supplies.....	13,530,679.16	385,578.06	Miscellaneous Accounts Payable.....	337,448.10
\$33,734,663.15	Other Current Assets.....	316,491.39	833,467.34	Interest Matured Unpaid.....	816,875.34
	Total Current Assets.....	\$37,527,156.67	9,609.20	Dividends Matured Unpaid.....	7,314.70
	UNADJUSTED DEBITS		2,325,169.13	Unmatured Interest Accrued.....	2,342,482.05
\$2,347,211.71	Capital Stock and Scrip, C. & N. W. Ry. Co., Held in Treasury.....	\$2,347,281.71	190,351.02	Other Current Liabilities.....	289,802.46
20,546,000.00	Company Bonds Held in Treasury and Unpledged	19,035,000.00	\$13,045,586.69	Total Current Liabilities.....	\$13,698,438.67
35,500,000.00	Pledged	35,500,000.00		UNADJUSTED CREDITS	
2,514,284.28	Other Unadjusted Debits.....	2,124,237.99	\$6,344,590.00	Tax Liability.....	\$7,278,737.00
\$60,907,495.99	Total Unadjusted Debits.....	\$59,006,519.70	537,565.36	Balance Premium on C. & N. W. Ry. 5% General Mortgage Gold Bonds of 1987.....	525,666.45
			\$2,389,869.16	Accrued Depreciation—Equipment.....	41,135,988.56
			58,578,856.51	Other Unadjusted Credits.....	614,985.92
			\$60,968,725.67	Total Unadjusted Credits.....	\$49,555,377.93
\$60,824,928.13	Total Assets.....	\$614,681,220.91	\$604,824,928.13	CORPORATE SURPLUS	
				Additions to Property Through Surplus.....	\$2,499,303.88
				Profit and Loss.....	62,031,847.15
				Total Corporate Surplus.....	\$64,531,151.03
				Total Liabilities.....	\$614,681,220.91

[ADVERTISEMENT]

Cr.	
Credit Balance, December 31, 1924.....	\$58,578,856.51
CREDITS FOR THE YEAR ENDING DECEMBER 31, 1925:	
Credit Balance of current year's Income, brought forward from Income Account (see statement, page 22.).....	3,410,828.02
Net profit from sale of Land Grant lands.....	1,055,851.20
Net Miscellaneous Credits.....	101,294.24
	\$63,146,829.97

Comparative Statement of Income Account

	Year ending December 31, 1924	Year ending December 31, 1925	Increase or decrease
Average mileage of road operated	8,462.83	8,467.56	4.73
OPERATING REVENUES:			
Freight	\$103,516,754.39	\$104,888,463.38	\$1,371,708.99
Passenger	28,872,654.95	26,769,125.98	-2,103,528.97
Other Transportation.....	14,248,012.04	13,872,945.75	-375,066.29
Incidental	2,817,162.37	3,007,734.02	190,571.65
Total Operating Revenues	\$149,454,583.75	\$148,538,269.13	-\$916,314.62
OPERATING EXPENSES:			
Maintenance of Way and Structures	\$22,559,053.13	\$20,988,336.60	-\$1,570,716.53
Maintenance of Equipment	30,581,465.98	30,613,191.90	31,725.92
Traffic	2,047,150.99	2,143,148.71	95,997.72
Transportation	60,501,485.80	56,955,609.91	-3,545,875.89
Miscellaneous Operations.....	975,496.41	1,067,958.57	92,462.16
General	4,142,007.70	4,095,019.55	-46,988.15
Transportation for Investment—Cr.	270,014.93	Cr. 237,209.66	32,805.27
Total Operating Expenses	\$120,536,645.08	\$115,626,055.58	-\$4,910,589.50
Net Revenue from Railway Operations.....	\$28,917,938.67	\$32,912,213.55	\$3,994,274.88
RAILWAY TAX ACCRUALS....	\$9,348,841.71	\$10,004,224.15	\$655,382.44

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UNCOLLECTIBLE RAILWAY REVENUES	63,521.45	46,872.54	-16,648.91
Total	\$9,412,363.16	\$10,051,096.69	\$638,733.53
Railway Operating Income	\$19,505,575.51	\$22,861,116.86	\$3,355,541.35
EQUIPMENT AND JOINT FACILITY RENTS—Net Debit..	2,721,524.65	1,752,367.24	-969,157.41
Net Railway Operating Income	\$16,784,050.86	\$21,108,749.62	\$4,324,698.76
NONOPERATING INCOME:			
Rental Income	\$866,535.69	\$694,685.21	-\$171,850.48
Dividend Income	1,977,534.00	1,050,047.00	-927,487.00
Income from Funded Securities	17,735.33	15,627.38	-2,107.95
Income from Unfunded Securities and Accounts, and Other Items.....	575,522.26	555,886.90	-19,635.36
Total Nonoperating Income	\$3,437,327.28	\$2,316,246.49	-\$1,121,080.79
Gross Income.....	\$20,221,378.14	\$23,424,996.11	\$3,203,617.97
DEDUCTIONS FROM GROSS INCOME:			
Rental Payments.....	\$19,031.49	\$41,681.04	\$22,649.55
Interest on Funded Debt..	12,333,590.57	12,425,298.31	91,707.74
Other Deductions.....	197,431.91	173,438.74	-23,993.17
Total Deductions.....	\$12,550,053.97	\$12,640,418.09	\$90,364.12
Net Income	\$7,671,324.17	\$10,784,578.02	\$3,113,253.85
DIVIDENDS:			
On Preferred Stock (7%)	\$1,567,650.00	\$1,567,650.00	
On Common Stock (4%)	5,806,100.00	5,806,100.00	
Total Dividends	\$7,373,750.00	\$7,373,750.00	
Balance Income for the Year, carried to Profit and Loss.....	\$297,574.17	\$3,410,828.02	\$3,113,253.85

Railway Financial News

(Continued from page 1183)

MICHIGAN CENTRAL.—*New Director.*—Jackson E. Reynolds has been elected a director to succeed Henry M. Campbell, deceased.

MINNEAPOLIS, ST. PAUL & SAULTE STE. MARIE.—*Equipment Trust.*—This company has applied to the Interstate Commerce Commission for authority for the issuance and sale of \$1,020,000 of 4½ per cent equipment trust certificates, to be sold to the Pullman Car & Manufacturing Company at 97.7946, in connection with the purchase of equipment to the amount of \$1,372,518, including 500 box cars, 1,000 gondola cars and 2 vestibule passenger cars.

MISSOURI-KANSAS-TEXAS.—*L. F. Loree Elected Chairman.*—At a meeting of the board of directors on April 19, L. F. Loree, chairman of the board of the Kansas City Southern, was elected chairman of the board of the Missouri-Kansas-Texas. It was expected that Harry S. Black who was elected a director a few days ago was to have been made chairman but these expectations were not borne out.

NATCHEZ, COLUMBIA & MOBILE.—*Operation of Line.*—The Interstate Commerce Commission has issued a certificate authorizing this company to operate by trackage rights over a line of railroad owned by the Denkmann Lumber Company extending from the present eastern terminus of the carrier's line at Tilton, Miss., where it connects with the New Orleans Great Northern to a connection with the Gulf & Ship Island at Oakvale, Miss., 7 miles. The purpose of the company's proposal is to open a new source of traffic to replace traffic now being lost through the exhaustion of timber tributary to its existing line.

NEW BANGOR & ARROSTOCK.—*New Directors.*—Col. Isaiah L. Stetson, president of the First National Bank of Bangor, Me., and F. A. Carleton, the Bangor representative of the Boston Fire Underwriters' Association, have been elected directors to fill vacancies.

NEW YORK CENTRAL.—*Equipment Trust Sold.*—J. P. Morgan & Co., the First National Bank, the National City Company, the Guaranty Company of New York and Harris, Forbes & Co. have sold \$11,172,000 4½ per cent equipment trust certificates of 1925, at prices to yield 4.65 per cent. The certificates will mature in

equal annual installments on May 15, 1927 to 1940. This is part of a total issue of \$22,500,000 covered by the equipment trust agreement of May 15, 1925, under which \$10,530,000 of certificates have already been issued. Of the balance \$798,000 maturing on May 15, 1926, will be cancelled, the present issue of \$11,172,000 completing the total of \$22,500,000. The equipment included has a total approximate cost of \$30,320,000.

Interstate Commerce Commission Approval.—The Interstate Commerce Commission has authorized an issue of \$11,172,000 of equipment trust certificates, to be sold at not less than 97½.

NEW YORK, ONTARIO & WESTERN.—1925 *Earnings.*—Annual report for 1925 shows net income after interest and other charges of \$41,067, equivalent to 7 cents a share on the common stock. Net income in 1924 was \$627,500 or \$1.08 a share. Selected items from the income statement follow:

	1925	1924
Railway operating revenues.....	\$12,247,511	\$13,666,132
Maintenance of way.....	\$1,890,167	\$1,988,991
Maintenance of equipment.....	2,322,776	2,471,934
Transportation	5,397,394	5,886,130
Total operating expenses.....	\$10,319,418	\$11,013,306
Operating ratio.....	84.25	80.59
Net revenue from operations.....	\$1,928,093	\$2,652,826
Railway tax accruals.....	431,181	477,249
Railway operating income.....	\$1,495,700	\$2,173,971
Equipment rates—Dr. bal.....	\$327,575	\$400,683
Joint facility rents—Dr. bal.....	76,665	97,920
Net railway operating income.....	\$1,791,460	\$1,675,368
Non-operating income.....	353,766	347,194
Gross income.....	\$1,445,226	\$2,022,561
Rent for leased roads.....	211,000	204,694
Interest on funded debt.....	1,162,325	1,165,025
Total deductions from gross income.....	\$1,404,159	\$1,395,061
Net income.....	\$41,067	\$627,500

NORTHERN CENTRAL.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$5,231,000 of general and refunding mortgage 5 per cent bonds, to be delivered to and guaranteed by the Pennsylvania.

NORFOLK SOUTHERN.—1925 *Earnings.*—Annual report for 1925 shows net income after interest and other charges of \$512,524, equivalent to \$3.20 a share on the common stock. Net income in

1924 was \$408,521 or \$2.55 a share. Selected items from the income statement follow:

NORFOLK SOUTHERN		
	1925	1924
Average mileage operated.....	931.88	931.88
Railway operating revenues.....	\$9,131,878	\$9,291,928
Maintenance of way.....	\$1,191,523	\$1,213,230
Maintenance of equipment.....	1,320,534	1,381,759
Transportation.....	3,552,143	3,693,826
Total operating expenses.....	\$6,686,088	\$6,932,095
Operating ratio.....	73.22	74.60
Net revenue from operations.....	\$2,445,790	\$2,359,833
Railway tax accruals.....	531,491	511,782
Railway operating income.....	\$1,900,088	\$1,839,145
Net railway operating income.....	Not shown	
Non-operating income.....	\$73,226	\$75,482
Gross income.....	\$1,973,314	\$1,914,627
Rent for leased roads.....	167,102	158,116
Interest on funded debt.....	857,380	871,558
Total deductions from gross income.....	\$1,460,790	\$1,506,105
Net income.....	\$512,524	\$408,521

PENNSYLVANIA.—Equipment Trusts Sold.—Kuhn, Loeb & Co. have sold at an average price of 98½, giving an average yield of over 4.67 per cent, \$17,000,000 4½ per cent equipment trust certificates, series D. The certificates will mature in equal annual installments on May 1 in the years 1929 to 1941. The equipment includes 200 locomotives, 2,000 steel automobile box cars and 214 passenger train cars and 20 electric multiple unit cars having a total approximate cost of \$24,400,000.

Application to Interstate Commerce Commission.—Application for authority for an issue of \$17,030,000 of 4½ per cent equipment trust certificates, to be used in the purchase of equipment to the amount of \$24,375,010, has been filed with the Interstate Commerce Commission. The certificates are to be sold to Kuhn, Loeb & Co. at 97.

PENNSYLVANIA & ATLANTIC.—Abandonment.—This company, which was formerly leased by the Pennsylvania and which is still controlled by the Pennsylvania though ownership of capital stock, has been refused permission by the Interstate Commerce Commission to abandon its branch line from Pine Beach, N. J., to Island Heights, 1.2 miles, principally for the reason that no other transportation service is available.

ST. LOUIS-SAN FRANCISCO.—Preferred Stockholders Start Suit.—A suit for an accounting to its preferred stockholders was filed against the St. Louis-San Francisco in the United States District Court in St. Louis, Mo., on Tuesday, April 13, by counsel for Carl W. Brown of Connecticut who claims to hold 100 shares of the preferred stock of the railroad. His petition alleges that the railroad while failing to pay accumulated preferred stock dividends has resumed payment of common stock dividends in alleged violation of an agreement with its preferred stockholders entered into at the time of the reorganization of the Frisco System in 1916. This agreement, it is set forth, provided that no common stock dividends should be paid in any year until preferred stockholders had received six per cent and that no dividends should be withheld in any year in which the railroad showed net earnings in order that a fund might be created for the payment of common stock dividends in subsequent years. It is then recited that in but two years since its reorganization did the railroad fail to earn a sum sufficient to pay the \$450,000 annual preferred dividends and in other years up to 1924 it earned amounts ranging from \$753,013 to \$5,925,574. The petition further charges that while there is now alleged to be \$3,045,372 in unpaid preferred stock dividends on the basis of the 1916 agreement, four dividends of \$63,058.75 each were paid during 1925 to holders of common stock in the railroad. The court is asked to determine what sum preferred stockholders are entitled to and to restrain the railroad from paying further dividends on its common stock until the issue raised in the suit has been determined.

President J. M. Kurn of the Frisco, in commenting upon the suit, stated that there is no basis for it and that "he could see no reason whatsoever for the filing of such a suit." Mr. Kurn stated that the reorganization plan perfected in 1916 left it entirely to the discretion of the directors as to when dividends should be declared on both preferred and common stock. He said further:

"Dividends on preferred stock are not cumulative and the stock certificates so state. There was no agreement whereby dividends on preferred stock would be made cumulative. Carl W. Brown, of Connecticut, on whose

behalf this suit was filed, first appears on our books as a stockholder of record as the owner of 100 shares of preferred stock as of February 19, 1926. On October 1, 1924, dividend of 1½ per cent on preferred stock was declared and paid covering the last quarter of 1924, or in other words at the rate of 6 per cent per annum. On December 3, 1924, the full dividend of 6 per cent was declared and set aside for the payment of dividends on preferred stock for the entire year of 1925, and these dividends were paid for that year. On December 2, 1925, the full dividend of 6 per cent on preferred stock was declared and set aside covering the entire year 1926, and these dividends are being paid quarterly. On December 3, 1924, the board of directors declared quarterly dividends of 1½ per cent on the common stock payable January 15, 1925, to holders of record as of January 2, 1925. On March 4, 1925, similar dividend was declared on the common stock payable April 1, 1925, to holders of record as of March 16, 1925. On May 20, 1925, a similar dividend was declared on the common stock payable July 1, 1925, to holders of record as of June 15, 1925."

SEABOARD AIR LINE.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$3,631,398 of 4 per cent refunding mortgage bonds, to reimburse the treasury for capital expenditures made in 1925, and to be pledged as collateral under its first and consolidated mortgage. Authority was also asked to issue \$3,811,500 of the first and consolidated mortgage 6 per cent bonds and to nominally issue \$2,022,000 of such bonds, to be pledged as collateral for short term notes.

TEXAS-MEXICAN.—Offers Refused.—The Mexican government is understood to have refused offers from both the Missouri Pacific and the Southern Pacific for the purchase of the Texas-Mexican, which is controlled through majority stock ownership by the Mexican government. The Texas-Mexican is a line in Texas 161 miles long extending from Laredo, Tex., eastward to Corpus Christi. Its value has recently been increased by the discovery of oil along the line.

TRINITY & BRAZOS VALLEY.—Receiver's Certificates.—The Interstate Commerce Commission has granted authority for the issuance of \$90,000 of second series receiver's certificates, to be delivered to the Chicago, Rock Island & Pacific for advances and for the extension of the time of payment of \$210,000 certificates, series A, now due and unpaid, to January 1, 1927.

UNION PACIFIC.—Correction.—In the excerpts from the twenty-ninth annual report that appeared in the *Railway Age* of April 17, 1926, on page 1120, the figures for the years 1925 and 1924 for Account 701—Investment in Road and Equipment—were transposed, due to a printer's error.

Dividends Declared

Atlantic Coast Line.—Common, \$3.50, semi-annually; common, \$1.50, extra, both payable July 10 to holders of record June 15.
Georgia, Southern & Florida.—First and second preferred, 2½ per cent, semi-annually, payable May 27 to holders of record May 13.
International Railways of Central America.—Preferred, 1¼ per cent, quarterly, payable May 15 to holders of record April 30.
Pullman Company.—\$2, quarterly, payable May 15 to holders of record April 30.

Average Price of Stocks and Bonds

	April 20	Last Week	Last Year
Average price of 20 representative railway stocks.....	87.72	87.59	77.33
Average price of 20 representative railway bonds.....	95.43	95.16	90.25

Valuation Reports

The Interstate Commerce Commission has issued valuation reports in which the final value for rate-making purposes of the property owned and used for common-carrier purposes as of the respective valuation dates is stated as follows:

FINAL REPORTS		
South San Francisco Belt.....	\$69,498	1916
Baltimore & Sparrows Point.....	281,500	1915
South Manchester.....	171,188	1916
Tug River & Kentucky.....	381,630	1916
Talbotton.....	78,957	1915
Stanley, Merrill & Phillips.....	571,789	1916
Canadian Pacific (Lines in U. S.).....	750,000	1916
Woodstock.....	489,213	1917
Beaver Valley.....	110,152	1916
Roanoke River.....	160,000	1918
TENTATIVE REPORTS		
New Jersey, Indiana & Illinois.....	245,050	1916
Upper Merion & Plymouth.....	358,150	1917
Rockingham.....	290,500	1917
Grafton & Upton.....	521,500	1916
Louisiana Western.....	6,472,500	1918
St. Joseph Belt.....	285,039	1917
Alton & Southern.....	1,627,000	1919
Chester & Delaware River.....	330,000	1917
Washington & Lincoln.....	190,500	1918
St. Louis, Kennett & Southeastern.....	211,829	1918
Shearwood.....	241,045	1918
Neame, Carson & Southern.....	34,904	1919

Railway Officers

Executive

F. W. Webster has been appointed vice-president and general manager of the San Jose Railroad, with headquarters at San Francisco, Cal., succeeding **F. E. Chapin**, deceased.

W. C. Hurst, formerly vice-president and general manager of the Chicago, Peoria & St. Louis, has been appointed senior vice-president of the Chicago & Illinois Midland, instead of the Springfield, Havana & Peoria, as was erroneously reported in the *Railway Age* of April 10. The Chicago & Illinois Midland will operate, under lease, the Springfield, Havana & Peoria and has trackage rights over the Illinois Central between Pawnee Junction, Ill., and Springfield, connecting the two properties. **Maurice Dailey** has been appointed vice-president in charge of operation of the Chicago & Illinois Midland, with headquarters at Taylorville, Ill.

Financial, Legal and Accounting

C. F. Bartelheim has been appointed auditor freight receipts of the Great Northern, succeeding **E. J. Willis**, deceased. The position of assistant auditor freight receipts has been abolished.

Operating

Norman M. Lack has been appointed assistant to the general manager of the Alaska Railroad, with headquarters at Anchorage, Alaska, reporting to the general manager.

Leroy Relyea has been appointed assistant superintendent of the River division of the New York Central and the Ottawa & New York, with headquarters at Weehawken, N. J.

M. G. Crawford, traveling car service agent of the Northern Pacific, with headquarters at Seattle, Wash., has been promoted to assistant general superintendent of transportation, with the same headquarters, succeeding **I. B. Richards**, deceased.

W. F. Schaff, who has been promoted to assistant general manager of the New York Central, lines west of Buffalo, with headquarters at Cleveland, Ohio, entered railway service in 1894 as a clerk on the Cleveland, Cincinnati, Chicago & St. Louis at Springfield, Ohio. He was promoted to yardmaster at Louisville, Ky., in September, 1895, and held that position until September, 1904, when he was promoted to general yardmaster at Indianapolis, Ind. Mr. Schaff was promoted to trainmaster in February, 1906, and was promoted to assistant superintendent on the Lake Shore & Michigan Southern, now a part of the New York Central, in June, 1909. He was transferred to Buffalo, N. Y., in January, 1910, and in November of the following year was transferred to Cleveland. Mr. Schaff was promoted to superintendent, with headquarters at Detroit, Mich., in December, 1912, and was transferred to Cleveland in March, 1915. He was promoted to general superintendent, with headquarters at Chicago in May, 1917, where he remained until his recent promotion to assistant general manager.

Traffic

T. J. Dowdell has been appointed general agent of the Pittsburgh & West Virginia and the West Side Belt, with headquarters at Cleveland, Ohio.

J. B. Norman has been appointed freight service agent of the Central of Georgia, with headquarters at Birmingham, Ala., succeeding **F. H. Brady**, who has resigned to engage in other business.

C. J. Collins, manager of the tours department of the Union Pacific, with headquarters at Chicago, has been promoted to general passenger agent, with headquarters at Portland, Ore., succeeding **William McMurray**, who has retired on account of ill health.

L. L. Moore, chief clerk in the traffic department of the Ft. Smith & Western, with headquarters at Ft. Smith, Ark., has been promoted to traffic manager, with the same headquarters, succeeding **G. L. Oliver**, who has resigned to enter the service of another company.

Mechanical

Irving C. Blodgett has been appointed assistant to the mechanical superintendent of the Boston & Maine, with headquarters at Boston, Mass., succeeding **Frank H. Becherer**, who has resigned to become superintendent of the car department of the Central of New Jersey. A sketch of Mr. Becherer's railroad career appeared in the *Railway Age* of July 4, 1925, page 68.

Engineering, Maintenance of Way and Signaling

H. S. Jones has been appointed valuation engineer of the Gulf, Mobile & Northern, with headquarters at Mobile, Ala.

Special

M. M. Miller, assistant manager of the ferry station of the Southern Pacific at San Francisco, Cal., has been promoted to manager, succeeding **James Ogara**, deceased.

Obituary

E. J. Willis, auditor freight receipts of the Great Northern, died suddenly on April 14, in St. Paul, Minn.

Colonel George Ham, journalist and publicist and for many years closely connected with the Canadian Pacific, died in Montreal on April 16, in his seventy-ninth year. He had been ill since November, 1924, and for the past six months had been confined to his bed.

Peter W. Van Bergen, supervisor of power plant of the Grand Central Terminal, New York City, died suddenly of a cerebral hemorrhage on Saturday, April 17. He was stricken while attending the funeral services of his immediate superior, the late Willard G. Carlton, who was superintendent of power of the New York Central.

Willard G. Carlton, superintendent of power, electric division and Grand Central Terminal, New York Central, died on Thursday, April 15, after a very brief illness. Mr. Carlton was born on February 20, 1869, in Warren, Ill., and was educated at the College of Mechanical Engineering, Cornell University, and was graduated from there in 1892. For some time after his graduation, Mr. Carlton was with the Chicago Edison Company, and went to the New York Central on October 1, 1905, about a year previous to initial electric operation, as superintendent of power for the Electric division. On January 1, 1915, he was appointed superintendent of power, Grand Central Terminal, in addition to his other duties, which positions he held until the time of his death. He was in charge of the operation of power stations, substations, transmission and distribution system, terminal service and boiler plants, and the supply of heat, light and power to the buildings in the Grand Central Terminal.

John Rourke, general superintendent of the Boston & Maine, died at his home in Melrose, Mass., on April 17. Mr. Rourke was born on January 4, 1867, at Marshfield, Mass., and was educated in the public schools. He was for a time a telegraph operator for the Old Colony (now a part of the New York, New Haven & Hartford), and in 1887 entered the service of the Boston & Lowell (now a part of the Boston & Maine), as a telegraph operator at Chelmsford, Mass. A little over a year later he became train dispatcher of the Southern division, and in 1900 was promoted to chief dispatcher. He served in that capacity until 1905, and then became assistant superintendent of the Southern division at Boston, and six years later removed that office to Concord, N. H. In 1913 he returned to Boston as superintendent of the Portland division, and in 1922 was appointed acting general superintendent of the first district. On January 10, 1923, he was appointed general superintendent of that district. On September 1, 1925, his jurisdiction was extended over the entire Boston & Maine system, and he was holding this position at the time of his death.